TECHNOLOGICAL CHANGE AND ITS IMPACT ON P.E.I.

PROGRAM

8:00 a.m.	Registration
8:30 a.m.	Welcoming Addresses Invocation - Archdeacon Rovert Power Town of Summerside - Mayor Mel Campbell Labour Canada - Bernie Leblanc Ministry of Labour P.E.I. - Hon. Roddy Pratt Chairman L.M.R.C. - Iain Galloway
9:00 a.m.	Presentation of Conference Theme, Conference Chairman Edgar Gallant, Chairman Public Services Commission, Ottawa
9:15 a.m.	Understanding Technology, An Introduction Professor Ivan Blake, Mount St. Vincent University Halifax, Nova Scotia
10:00 a.m.	Coffee
10:15 a.m.	PANEL - TECHNOLOGICAL CHANGE IN THE WORKPLACE PUBLIC EXPECTATIONS AND IMPLICATIONS FOR P.E.I. Presentor: Ian MacKinnon, Vice-President Decima Research Labour Response: Jim Schneider, National Co-ordinator, Education Services, Canadian Labour Congress Business Response: Don Livingstone, President and Chief Operating Officer of Island Telephone Company Ltd.
12:00 noon	Luncheon
1:30 p.m.	PANEL - TECHNOLOGY'S IMPACT ON P.E.I. TO THE YEAR 2000 Presentor: Marc Zwelling, Vector Publications Labour Response: Nancy Riche, Secretary-Treasurer of National Union of Provincial Government Employees Management Response: Francis Reid, General Manager, P.E.I. Construction Association and member P.E.I. Labour-Management Relations Council
3:00 p.m.	Coffee
3:15 p.m.	Small Group Discussions
4:45 p.m.	Report Back to Plenary
5:30 p.m.	Reception and Banquet Banquet Speaker: Hon. Tom McMillan, Minister of the Environment
7:30 p.m.	Adjournment

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Iain Galloway: (speaking for Edgar Gallant, who was ill)

The theme of the conference, technological change, and its impact on P.E.I. represents quite a challenge. Some may ask what we mean by technological change, and why is it so important for us Islanders, protected as we are by salt water and isolated, insulated, from all this industry. What does it mean for us Islanders? Is it important for us to study its impact? Well, it's a fact that our environment, be it the local environment, the regional environment, the national or the international environment, is subject to a continually increasing rate of technological change It's a fact of life world wide, so we are not insulated from its impact.

In one way or another, the life of every individual on our planet is affected by the impact of technological change. Some call it progress, but there are different attitudes towards progress. You heard Mel Campbell a few minutes ago, not feeling that technological change was always progress. Some of us I'm sure feel the same. We'd like to throw some of the so-called progress out the window, however, it's there so we can't deny its presence. And it's basically there because of incredible technological advances since 1945, the end of the last war. That was when came the invention of the funny little thing, so small you could stick it in your eye almost, it's called the chip, the micro-chip. The micro-chip is diffusing 7 to 10 times faster than any previous technology, and because of this advance in the chip, the implication for employment constitutes a very lively topic. A very difficult topic.

There are various attitudes towards these advances of the micro-chip and technological change, which depends on the micro-chip. There are optimists around us and the optimists want to rely on the historical record of continual adaptation to technological change. Technology is not something new, it hasn't just suddenly appeared from nowhere, from being primitive to being suddenly all technologically sophisticated. It's been around for quite a long time. And the optimists feel that all other technological change seems to have worked out all right, here we are living with a lot of technology, motor cars being one of them, and they figure things will work out again with the new technology.

There are pessimists, on the other hand, and the pessimists see the current era as technical revolution, which unfortunately, for many of the pessimists anyway, has gone wild and it's going to cause us all sorts of problems. Problems with the work force, problems with unemployment and soforth. This is the pessimists attitude. But then, somewhere in the middle of these two there are the realists, who feel there is something to be gained by it if you play it carefully, you have to watch what's happening but on the whole you can probably gain by this.

My understanding is that in western European countries the outlook of the majority concerning the impact of technological change on the employment of the masses, is generally rather negative. But in Japan and the U.S. the outlook is more positive, based on the view that the rewards of economic growth will compensate for large scale labour displacements. On one hand you have labour displacements because of technology, but on the other hand more productivity in terms of cash value will compensate for that. I've also been told that technological change will impact more negatively on the large industrialized regions and more positively on the outer regions, presumably P.E.I. being an outer region, and technology may have more of an impact on these industrialized regions rather than the less industrialized regions. All seem to agree that countries which lag in the introduction of new technology, and when I say all I mean those who are pessisimistic about technology and those who are optimistic about technology, nevertheless they all seem to agree that countries which lag in the introduction of new technology suffer much greater unemployment than those which lead in the introduction. So like it or not we'd better be in the forefront in the introduction of and the use of technological change, and not lag behind other countries.

I believe that as a country, Canada is now facing the double challenge of, firstly, ensuring that we are and will remain on the leading wave of technological progress, and in our estimation we are right up there in technological progress, and secondly we have to ensure that the economic and social rewards as well as the burdens, because there are not only rewards in technology there are also problems, pains and burdens, so we have to ensure that the rewards as well as the burdens which flow from technologically advanced productivity are shared equitably by all Canadians. That is that technology not be used to benefit the few but to benefit all Canadians. The issue of distributing the gains and the pains of new technology, because there's both, is both crucial and contentious, but it will be difficult to maintain our place on the leading edge of technological progress without a workable answer to the distribution question. When I say distribution I mean advantages and disadvantages, gains and pains, this is distribution, spreading the load of both rewards and burdens. What we need then is obviously to maintain our place at the leading edge of technology but it'll be difficult without a workable answer to this question of distribution. Governments at all levels, provincial, federal and even perhaps local governments will be addressing these distribution questions eventually, but I think most here would agree that workers, through their unions and employers, are the best people suited to answer these questions. You guys in the work place, you're the ones who may see more clearly than anybody else answers to the problem. Why? Because you have the most experience in this particular area. Collective bargaining, which is the main contact between unions and employers, is after all no more than a distributive process and it is one which labour and management know very well. Most of the distribution decisions in the technological revolution can be made at the bargaining table if the two sides are sufficiently innovative and flexible and determined.

Indeed, unions and management have been aware of the distribution issues of technological advance for many years. I have a little story at this point. Henry Ford, you many be familiar with, was a motor car manufacturer at one time. There's a famous story about contact between him and Walter Reuther, who is equally famous almost as the head of the Auto Workers Union, and he was of course at the leading edge of technological advance in his factories, Henry was, and was boasting to Walter, "Now you've got a problem haven't you. How are you going to get these robots to sign union cards?" Walter came back at him and said, "Well that may be a problem, but you also have a problem." "What do you mean," said Henry, "these robots work very well, all these automated things work perfectly." "Yes," says Walter, "but how are you going to get them to buy cars?" And that is a problem. Technological change doesn't come all by itself. If you're putting people out of work, then there's no money circulating. That can be a problem too.

Although the rate and scope of technological advance today dwarfs that of the 1960's, this story illustrates very well the problem we have right now. We have the advantage of so called faster, more efficient methods of doing things, but if that is at the cost of putting people out of work, are we much further ahead?

So, what is our purpose in today's deliberations? It would be pretentious on our part to believe that at the end of the day we shall have mapped out the course along which technology will progress, and we'll have planned the actions to be taken by all of us, and the institutions we represent, to enable P.E.I. to take full advantage of opportunities and to protect itself against undesirable or unwanted consequences. We can't do that in one day and that's not our purpose. What we can hope to achieve, however, is, 1) to improve our understanding of, and enhance our sensitivity to the technological advances that are as inevitable as the regularity of the tide, so we have to be aware of it and understand it better, that is our purpose today, and our second purpose is to increase our understanding of, and appreciation for the hopes, expectations, concerns and fears of the various members of our community in regard to the impact of technological change. If we succeed, and we shall, because in a way we're condemned to succeed, we cannot risk failure, it may be possible for next year's conference to focus more certainly on aspects of the impact of technological advancements having special significance for P.E.I. For those of you who are not quite aware of this allusion, we are envisaging this vast subject as spilling over into another conference next year.

Ivan Blake:

John Stuart Mill, that most eloquent of liberal philosophers, advocate of the rights of women and contemporary commentator without equal, amid the awesome achievement and horror that was industrial Britain, was moved to write: "It is questionable if all the mechanical inventions yet made have lightened the day's toil of any human being." How could so astute an observer have missed so many tangible signs of the improved lot of his fellow Britons; how could he have doubted the remarkable accomplishment of Industrial England, workshop to the world? He missed none of the signs; on the contrary, he recognized that Britian's industrial miracle had changed fundamentally the context in which work was being performed, as well as the kinds of work assigned. But he also recognized that the changes had not alleviated work's burdensome, usually tedious, often unsafe, always insecure character.

I've set myself three tasks for this presentation: to cast technological change in an historical context, to describe some lessons already learned from a decade of experience with the new technologies, and to suggest some measures we might adopt in determining our technological future. An array of questions attend these tasks: in the century since Mill, has technology succeeded in lightening the day's toil, at least for some; if technology has not improved, how has it at least *altered* the lives and lot of working people; what technologies does the future hold for Canadians; how *will* technological change affect Canadians to the end of the century. Myriad books, many of them paperback best sellers, have offered exhilerating, intimidating, chilling or reassuring answers variously alluding to VDT diseases, deskilling, home computer sweatshops, an information revolution, the death of individualism in an age of central data processing or conversely to the life long learning imperative, to the demise of tedium and to the triumph of creative individualism, borne aloft by the "Third Wave". But to the question, "How will new technologies affect people?" my answer is somewhat more prosaic--it will depend. How we shall be affected by new technologies will depend upon a range of choices made by people--specifically but not exclusively people with power in key institutions--concerning the context in which technology is applied, its design, intended applications and manner of introduction.

Nothing is new in this. To set contemporary technological change in an historical context and to derive a number of lessons with which to enlighten an examination of current options, let me share with you my potted history of what I'd like to suggest are our top ten technologies. Indulge me. My list comprises: the block and tackle; the moldboard plow; the stirrup; the pike; the printing press; double entry bookkeeping; the card catalogue; the clay pipe; gas lighting; and the machine gun.

The world's first great empire, the Roman Empire was in reality an aglomeration of trading colonies; their trade in commercial quantities of grain and wine was made possible by the decking-over of their ships for winter service and by the block and tackle; you can't conduct profitable trade if you can't have commercially viable quantities of goods aboard transport. But the Roman Empire fell to another technology (not to discount the part played by measles and malaria which made urban life and, in turn, commerce impossible) --the moldboard plow. Invented by germanic tribes around the time of Christ and brought to Europe in the 2nd century A.D., the moldboard, unlike the scratchplow which as its name implies merely scratched the soil, turns a furrow and creates drainage channels in damp soils thereby rendering the damp soils of Europe agriculturally useable, a feat never achieved by Europe's Roman conquerors. The barbarians may have been a smelly lot but they enjoyed an agricultural superiority to Rome and in turn a health and demographic advantage. They conquered Rome through better farming. But their social organization was merely tribal, that is small scale, localized and kin-based until a third technology galvanized the tribes to more elaborate social organization. The feudal system... a lord charged with local defense, supported by an agricultural community enjoying his protection... was Europe's response to the mounted terror from North Africa, the Moslem knight, his awesome striking power made possible by the simple stirrup. But if the stirrup gave rise to the knight, the feudal order, the manorial village and the first monarchs of Europe, an even simpler technology devasted the military order upon which the whole edifice was based. The pike braced by the foot of a lowly infantry man, a peasant without status, empaled the flower of chivalric Christendom and created a power vacuum in 14th century European society, not to mention the damage done to the concept of class in having peasants kill lords so gracelessly. Into the vacuum created by the demise of the feudal order stepped the merchant, whose stature soared with the development of two technologies: printing and accountancy. The first book printed may have been a Bible but the second was a volume of compound interest tables and the third a set of business forms. But perhaps printing's most potent contribution to 15th century society was accuracy--a commodity essential to business; reliable, identical texts in unlimited quantities transformed scholarship, religion, business and governance. Whim, calculated deception, forgery, memorization, folk tradition--all fell prey to accurate, reproduceable information.

The age of information was born, the age of oral tradition died. But the scale of business would not have been altered by the book alone; international enterprise and overseas empire, the accomplishments of the 16th century, are the children of double entry bookkeeping. You can't run an empire if you can't keep good books. But if that much maligned profession of accountancy can take credit for the creation of colonial states like Canada, the modern state must pay its homage to the librarian. The greatest challenge faced by states in the 18th century was the task of controlling enormous numbers of people. Revenue collectors, the first bureaucrats, kept good records of accounts paid, thanks to the principles of accountancy, but lacked the most basic information about the population eligible to pay. In the absence of reliable manipulable information about its citizenry, the state's efforts to project revenues, raise armies and control its dissidents were for naught. The solution was simplicity itself--the card catalogue--and it gave rise to modern states, the modern police forces, the modern armies, the modern enterprises, and modern information workers (who now number 50% of the labour force and earn 70% of all salaries and wages). But the information worker is a creature of the city and cities at the beginning of the 19th century killed more of their inhabitants than they bred; only immigration sustained their population. Cities were places of filth and disease. The inescapable fate of urban dwellers was to live all of their lives in the intimate presence of their own waste. Until, that is, a way was found to deliver water under pressure to city dwellers, in part to provide potable water but far more important, to flush human waste away. The modern city is the creation of the clay pipe. But its hours of activity were constrained by the sun and social contact limited to the hours of daylight. Even the family as we know it was nonexistent. Up with the sun and immediately to work, to bed with its setting because the high cost of illumination made the evening the exclusive preserve of the well-to-do. Gas illumination gave rise to evening commerce, to city shopping districts made economic by the extension of the business day, even to the department store. But the economies of scale made possible by urban gas illumination systems brought inexpensive illumination into the poorest home and gave rise to the modern family characterized by its bonds of affection and shared society outside the economic activities required to sustain life.

All of the above gave rise to boundless confidence in the unstoppable march of civilization, in the irresistable force of "progress". States knew what they needed to know about their citizenry for the purposes of defense and tax collection but had little interest in managing any other aspects of their national life; this was less and less the case as one travelled east from the Atlantic states toward Russia; proportionately more "managers" were to be found in government service. But in the West governments were content to stay out of the way of market and social forces. Until, that is, World War gave the lie to the unstoppable march of civilization and reacquainted civilization with the fragility of all of its achievements, and more profoundly, with the capacity to human kind even in the twentieth century to squander life in more squalid ways and in more beastial numbers than any other species. And the doing of this thing introduced government to its awesome capacity--acquired merely by reconfiguring systems already in its power--to manipulate all the resources--human, material and financial--of the nation. It was a heady lesson; after the First World War states tried to forget it; but they could not. We have the machine gun--the world's first truly efficient, utterly unromanticizeable killing machine to thank for this. The young men who marched away in 1914 should have been heroes enough to sustain a genteel war of many months; dead within weeks their places had to be repeatedly filled by human fodder freed from other labour by means of a massive organizational effort. Have no illusions about the state; make no jokes about its incompetence or its inefficiency. History teaches us that the one inexorable process in the past has been the progress (if this be called progress) of government toward maximal efficiency. It has done so in quantum leaps; as we discuss technologies today, never lose sight of the fact that just as they are available to enterprise so they are also available to government. You may applaud more efficient government. I'm not sure I wouldn't be more confortabe with government that stumbles, admits weakness, makes mistakes--like me.

My personal concerns regarding technologies and government aside, what insights can be derived from the potted history I've presented. First, the cultural context influences the choice of technologies, their application, their impact but is in turn impacted, changed by the consequence of those choices. Second, the impact of a technology upon its users and its context is not a function of its complexity; quite the reverse in fact. Third, not just new technologies but new uses or new combinations of older technologies may have equally profound consequences. And fourth, fear, warnings, opposition to new technologies are as old as tools themselves. Monastic librarians condemned the printed book as a denigration of the written word and printers as the devil's craftsmen. Lords called for the abolition of the Pike and the crossbow for the damage they would do to social order. Church ministers warned of the spread of lasciviousness and of overpopulation if the poor enjoyed lights in their bedchambers. And politicians have always used the most exaggerated language to describe the effects of technology.

There have of course been equally many advocates or optimists regarding technology. Does the debate, or do the warnings differ markedly today? The pace of technological change has of course quickened in this century. The perceived speed with which technologies are developed and introduced exaggerates their complexity and potential to effect radical change. In fact, just two scientific developments in this century are really at the heart of so many of the most powerful new technologies: digitization, that is the rendering and attendant storage and manipulation of qunata of information in numeric form; and the discovery of DNA, that is the unlocking and attendant manipulation of the genetic codes in all life forms. Ortega y Gasset described the barbarian as a creature living in an environment of which it possesses, or seeks to possess, no understanding whatsoever. Ortega argued that virtually all people in the 18th century who can be described as having been educated, thoroughly understood the issues and the frontiers of scientific enquiry in their day. Today however, Ortega charged, we have become for all our so-called education, barbarians existing in a technological environment of which we understand or care to understand very little. And whether a commentator believes ordinary people will participate knowledgeably in the debates attending technology and science or not seems to determine whether the writer is an optimist or pessimist regarding our technological future.

The optimists share the belief that the new technologies will lead to a better future for all and that the new technologies can be introduced without radically altering the existing social arrangements and distribution of power in western societies. A variant of the optimists' school is represented by those writers who contend the new information technologies will affect a major shift and redistribution of concentrations of power in entirely new directions. Just as capital and labour were the central variables of industrial society, says Daniel Bell, so imformation and knowledge will be the crucial variables of post industrial society. There are various kinds of optimists: technicists who hold the niave beliefs that new technology is synonymous with progress and that the only problems are practical ones caused by faulty design or implementation; progressive individualists who believe the new technologies will be beneficial in the long run but that elites and established bureaucracies will obstruct the widespread distribution of benefits; elitists who believe a technocracy of computer specialists and their allies will be necessary to ensure economies and nations are properly managed; and pluralists hold to the classical view that countervailing interest groups will check each other and assure a positive outcome to technological change.

The pessimists see mass unemployment and increasing control by the state and its allies in the corporate boardrooms as the inevitable consequences of the new technologies. Radical critics they are sometimes called; they warn of the almost total domination of a powerless majority by a capitalist elite. The pessimists are of two kinds: the determinists who, like the technicists see technology as an omnipotent determinant of the future, but who, unlike the technicists, forsee a world in which technology, developed and monopolized by multinational corporations in prusuit of maximum profit, with little interest in democracy or human needs, using technology to extend capitalist domination into every facet of society; and the devolutionists, only slightly more optimistic, who do accept that while the potential for increased inequality and control exists, there also exists the potential for creating alternate "people-friendly" social arrangements provided the will exists to wage the hard struggle to achieve them.

Events will probably show that the truth was to be found somewhere between the scenarios of the optimists and the pessimists. Indeed, their speculative and theoretical predictions aside the experiences of some sectors of society over the years, even decades with the new technologies do provide us with insight into the effects of the new information and manufacturing technologies upon employees, work and corporate organization. The following appear to be accurate generalizations.

First, there is no one unvarying impact of new technology on the organization into which new technology is introduced or on its employees--there are many different impacts, depending on the ways in which the technology is introduced, the technology itself, the intentions of those responsible for the change, and the way the employees react to and change the technology. If management has been seeking a way to completely reorganize employees or exercise greater control over them, the move to an office communications system for example provides an opportunity to do this. But the resulting effects on the quality of working life must be seen as the result not of the technology but of the management decision to reorganize.

Second, innovation does not just happen. The introduction of major technological change has required a promoter in virtually all organizations studied. In virtually every case, the decision to adopt new systems was justified on the grounds of lower labour/production costs and increased productivity. Different levels of the organization had different motives for supporting such systems--top management usually want a higher return on investment; middle management want more control over the workforce; and the supervisory staff want smoother work flow and fewer disruptions. Third, the potential of office communications systems to replace existing channels of communication has been highly exaggerated. Oral communications serve many functions inan organization beyond the mere transmission of information only a small protion of which will be replaced by technology.

Fourth, where technology is used to supplement or replace existing skills--for example replacing typewriters with word processors but leaving other aspects of the job unchanged--there seems to be minimal impact on job satisfaction, attitudes to work, health or any other variable. There may well be an impact on productivity but even that has not been conclusively demonstrated as yet, although certain kinds of paperwork do get done more quickly and efficiently. This same technological change, however, can produce increased dissatisfaction, and deskilling if staff are moved from traditional formats into central work processing pools. Their output of pages per day goes up, but the resulting lack of familiarity with the authors' individual styles and preferences means more time must be spent correcting documents.

Fifth, where people use the new technologies to amass information (e.g. managers, policy analysts), real though conflicting effects can be found. If the equipment delivers in a reliable, consistent fashior, managers may find their control of their work processes increased. It appears that stress and time pressure also increase, because the technology accelerates the pace at which decisions must be made. Moreover, the fact that more information is available makes people feel they must get and use it whether it is essential or not. My perosnal view is that the measure of the successful manager in years to come will be his or her ability to forget or at least the ability to distinguish the forgetable from the unforgetable. Frederick Nietzsche in the last quarter of the 19th century called for an art of forgetting; his words will assume ever greater currency in the last decade of the 20th century.

In manufacturing, technology has been designed and implemented primarily to replace workers, to reduce their control over the work process and to counter the labour cost advantage of competing industries in developing nations. It is clear substantial displacement of workers, and underemployment and deskilling for the remainder, have occurred. Automated factories often lead to more boredom, less autonomy, more centralization, more management monitoring and control, and less union leverage. On the other hand, such factories are usually safer, and the work is lighter and cleaner. Productivity, in terms of return on investment, is again problematic as the more efficient work process must be balanced against frequent system failures which now shut down all production rather than just a segment of it. (Downtimes seems to average almost 20%.) Moreover as workers exercise less control over the production process, they understand it less and develop fewer skills rendering them less promotable. And if one brought into the productivity equation the wider social costs of unemployment and underemployment, the net gains would be still more uncertain.

Overall, for both blue collar and white collar employees, the literature indicates that where technology is introduced with the participation of employees and is used to complement human skills, work satisfaction increases. Where it is used to overspecialize or displace human skills, dissatisfaction and/or significant job loss, which have already occurred in manufacturing are real possibilities in the office as well.

There is little solid evidence of the deskilling phenomenon forecast for office administration. Nor does the long predicted replacement of middle management seem ot be occurring, perhaps because they usually have some power to decide which groups in the organization are superfluous and people seldom eliminate themselves. Those least able to speak on their own behalf, or to exercise choice use the new technologies most even if others more senior ought logically to have been equally impacted. Never forget-- and general medical practice are as amenable to automation as clerical work. But articulate, organized professional associations would confound any effort to render them redundant. Having described some of the technologies which have shaped our past, some of the predictions concerning our technological future, and some of the lessons of our technological present, I now wish to give you a personal view of planning a Canadian technology future: which technologies we should be developing and not simply utilizing, how we should select our path, and what we'll probably do instead. For my comments on this topic, I must acknowledge my great debt to Prof. David Logan of York University.

In planning our technology future, the first step is to identify the broadest possible spectrum of potential technologies--emerging technologies, the technologies as yet in development.

This exercise can of course yield extremely long lists of candidate technologies. The Batelle Columbus Laboratory, for example, compiled a list of 250 potential technologies in 17 different categories. In a similar exercise the Japanese compiled a list of 800 candidate technologies. Candidate lists are not universal; geographic and cultural factors circumscribe even the broadest list. For example the Batelle list excludes Artic and agricultural technologies relevant to Canada. And North American lists typically include technologies related to physical needs but exclued technologies to increase human awareness and mental health and a variety of "technologies of the spirit" that address the human condition from within; such technologies by contrast do figure in Japanese lists.

Having assembled a national list of candidate technologies the task is then to select the appropriate technologies, likely to offer the best chances for a Canadian role and payoff. The trick will be to establish the criteria for selection. David Logan has proposed nine criteria:

1. Are there specific Canadian needs (geographic, political, economic) that the technology can meet or ameliorate?
2. How many people may be affected directly or indirectly?
3. Is there an existing industrial, research, leadership infrastructure that can develop and exploit the technology?
4. Are there markets both within and outside Canada for the "product"?
5. Does the technology have job creation potential?
6. Are the technological problems that have yet to be solved too great for our resources?
7. What are the indirect economic and social benefits to Canada? What are the disadvantages?
8. What are the environmental implications of the technology?
9. Is the technology itself important in the development of other technologies?

The preceding are rather broad social and economic criteria; but what if the selection were to be more political? The criteria might then be:

Which technologies will help government constituencies?
Which technologies could help bridge the French-English Schism?
Which technologies could provide us with improved weaponry?

In the best of all possible worlds perhaps selection would now be straightforward: a numerical weighting to each perhaps. But the process is seldom so simple; more often a 1000 or more people are asked to rank by importance and achievability from among the list. Even so abstract a planning process is rarely successful: because discovery and initial development of a technology is almost exclusively a solitary business; because our political and social systems are not rational and dispassionate, and it is unreasonable to assume that they will so behave in planning in the future; because funding of development will not be opportioned as might be required by our planning, but rather on the basis of what's good for the funder; and finally, because people remain delightfully individualistic and resist the best efforts of governments and business to channel their interests (read "money") and support. (Remember the Edsel.) For all of those reasons selection of future technologies to work on is likely to be made in a much more subjective way rather than an abstract planner might wish. And this is in fact what has happened in Canada. Even so, national planning is possible as the examples of New Zealand and Japan illustrate.

In the case of New Zealand planners started from a base of low government and university funding of science and technology, very low private sector funding and a national population cool to technological change. In spite of this, planners believed they had a high quality human base of considerable breadth and expertise to build on.

Their initial approach has been in part much narrower and more focussed than major technological countries, and recognizes the economic, geographical and social characteristics of New Zealand. On balance, New Zealand planning may be called conservative. The areas of interest selected are primarily areas of established activity that they wish to improve, or new technologies that are clearly becoming internationally utilized and therefore essential if New Zealand is to remain competitive.

Japan is the powerhouse of technology planning. Its stated national goal is to be the technological leader of the 21st century. To this end it does two kinds of planning: first, in everything it does, it grades its current technology against the best elsewhere (included in its comparisons may be total production, labour intensity and energy required per unit product, or worker satisfaction); second, it is at the forefront of planning regarding development and exploitation of future technologies. Japan has produced three "Technology Development Forecasts" in 15 years. In 1982, 800 candidate technologies were ranked by 2000 participants for importance and year of realization.

The list produced does not detail specific technologies, it is rather a listing of technological expectations. Japanese planning is driven by human needs, such as jobs, recreation and a high standard of living. But a measure of the importance the Japanese attach to this planning is the fact that the Council of Science and Technology which receives the report's distilled recommendations is chaired by the Prime Minister himself.

In the light of such examples how is Canadian technological planning coming along? Despite high interest and myriad pronouncements concerning technological promise, no coherent plan for Canada's technology future can be said to exist. David Logan contends Canadian technological progress is developing along two separate pathways. On the one hand the more advanced work is to be found in a number of industries where specific advanced technologies are being developed and utilized in response to specific problems. On the other, governmental activity is broader based, and is often aimed at supporting both directly and indirectly the development of a general industrial capability. Nowhere however do we see signs of an overall provincial or national strategy based upon extensive long-range plans. At the provincial level each province has its own industrial strategy derived primarily from human and material resources available, transportation and manufacturing or processing capability, and employment potential. At the national level, the economic problems of recent years, the death of several "Mega" projects, and the general industrial uncertainty have combined to paralyze any significant federal initiatives. Indeed, the current federal government seems more interested in divesting itself of research capability than in acquiring it.

Against this background, is it likely or even possible that Canada will develop a national technology plan? Probably not. This may not, of course be bad. What is most likely is that the individual provinces will act as quasi-coordinating bodies for the technologies that emerge within their boundaries. But there will be problems: first, employment opportunities are likely to be much less than generally anticipated; second, there is likely to be unproductive duplication as several provinces try to get on specific high profile bandwagons; third, and most regretably, several technologies that could be of tremendous benefit to Canada are likely to receive little or no support since they cna only be pursued by a concerted national effort.

What then are likely to be the technologies in Canada's future? Logan suggests they will be technologies derived mainly from the economic interest of regional or corporate groups. Among these are likely to be technologies that have no particular Canadian perspective byt derive from an admiration and envy of American technology. In short, in the absence of choices made wittingly by Canadians, the choices attending our technological future will be made for us.

To the question, what will the impacts of technology on Canadians be, I replied--it will depend. People--specifically, but not exclusively those in powerful positions in key institutions--determine whether technology will be designed and manufactured in ways which preserve national sovereignty, maximize human potential, creativity, and control, or which jeopardize, exclude and deny these characteristics. People--knowledgeable, articulate--will decide whether its distribution and use will be governed by private market forces and slanted in favour of developments which will make a profit, or thether certain applications and capabilities of the new technologies will be seen as public rights, commodities with national implications as public airwaves have come to be. The impact of technology must be seen as contingent on a whole series of human choices and decisions conditioned, as such choices always are, by the political, economic, and even cultural realities which dominate the particular society. Thus the science and technology produced by capitalist, U.S. dominated Canada is in the late 20th century will necessarily be of a character which reflects the social realations, productive relations, and values of our society, but this fact does not mean that employees, consumers, managers and others will have no voice in their future.

To summarize the lessons I derive from the literature, the history, the experience of the new technologies: every party to the process of technological change must strive to be informed, to be articulate, to plan, to be organized in the manner in which concerns are presented, to eschew myths, high flown expectations or alarmist scenarios. Above all we must strive to respect the skills, the proficiency and the integrity of every individual who must confront a new technology and to allow each person to speak.

NOTE: List of resource material available with L.M.R.C.

Ian MacKinnon:

What you are about to see are drawn really from two different studies of the Canadian population. We have, on various research survey pieces that we've done, asked Canadians about technological change, about high technology, about their experiences in the work place with technology, not to find out what's right or what's wrong about it; not to find out whether it should be put in place or should not be put in place, but rather it's our assumption that before you begin to understand the impact of what's going on, you have to understand about people's expectations about it. When we're talking about technological change, we're talking about far more than just silicone chips, more than just the new word processor that's just lurking in the corner of the office, more than that new machine that's been brought on to the floor that you plug computer cards into and it produces a different type of output. When you're talking about technological change you're really talking about how rapid changes in the physical work environment, in the world that surrounds us in our day to day work life, affects the individuals. You have to understand more than just what that machine is. You know you get an instruction manual with a word processor. That doesn't tell you how it's going to affect the job 9 to 5. It doesn't tell you about the insecurities that someone who may be a terrific typist feels suddenly facing this screen, having to flip it on. You know, when you hit the first key, back it comes: error message, syntax error.

Now that's the core dilemma in fact, in much of technology and the debate about technological change. We're great at inventing these things, at developing terrific micro chips, at figuring out how to invent a new process, write new software. What we're not that great about is figuring out what that means to the average person, what their concerns are, what their fears are, and it's my contention that we must understand people's concerns, (and interestingly, where they're not concerned) because some of the things that I'm going to show you today flag areas where there's an awful lot of concern. People think that technological change is going to bring about something, but when we talked to people who had seen thir own jobs change we found that the things that a lot of us worry about didn't happen.

One final thing before we get into it and it's on the use of public opinion research. I like to give this little lecture because polling and public opinion research has taken on almost a spooky aura of late that it somehow tells people what they should do, that it makes decisions for government, or for business, that polling now is something that has replaced thinking in terms of how one should make a decision and what decisions one should make. What I want you to keep in mind as we view this data that I'm going to show you, is that public opinion research will provide you with a map. It doesn't tell you where to go, but it will tell you a lot about the surroundings out there. It will tell you a lot about people's concerns and their hopes in this particular area as in many others. Because people are afraid of something doesn't mean you shouldn't do it. What it will give you is a much better sense of what is the source of their insecurities, so that as technological change progresses you can begin to work with the people and their concerns on the one hand, or be aware of where they really feel uncertainties.

Underlying everything we do and all our ways of interpreting the external world. When I read a newspaper item I don't look at it like a new born baby, I mean I bring with it all the preconceptions I have, my own understanding. Different societies use technological change differently, and are interested in pushing it into different areas. Why? Because those societies have different underlying values. We in our society have grown to value certain things and that will condition the way we look at it. Above that are attitudes and opinions, the information that we get from the outside, our understanding of the topic, our responses to any experience, and all of that conditions our behaviour. Now why have I put forward thispsychological model for something on technological change? For a very simple reason. Because as I said before, technological change is more than silicone chips, it's more than the manufacturing process, it's more than computers. What it is is people's behavior as they interact with that changed environment that they are now faced with in their work life, and it's going to condition whether technological change makes that person's work life better or worse, whether they accept it or oppose it, whether for a company it's functional to have technological change, to bring in a new technology or not.

Now, with that background, I want to show you one other thing before we really get into the high tech, because this is an underlying concern that will underpin everything we have on technology. We at Decima Research have for five years gone out once every three months and asked 1500 Canadians, 90 of whom live on P.E.I.--so in fact there's a high probability one of you has been phoned by us at some time--a series of weird questions about public policy. Every quarter we pull those together, analyze the data, sell it on a subscription basis under the name of the Decima Quarterly Report. One of the things that we've asked people is the following question. "How concerned are you that either you or the principal wage earner in you household is or might become unemployed?" A pretty complicated question but it covers all the bases. You can see there the effect of the recession, the peak is in the middle of 1982, so that by the depths of the 1982 recession we had a situation where 67% of Canadian households said they were somewhat or very concerned about personal or household unemployment.

Then we asked people, "what's the most important facing Canada today?" 60% for the last three years steadily said undmployment. That concern about job displacement and undmployment will underpin everything I say about technology, and technological change because that's what many people associate with it. One of the optimistic parts by the way, is that towards the end there you'll see it beginning to trail off just in the last year, and that's been associated with a lot of consumer optimism in the same period. One final thing I wondered when I first pulled this out is who the hell are those 27% that aren't concerned about unemployment, and wed did cross-tabs to find out who those people are. Over half of them are retired. So when you take them out of the picture, let me tell you, you've got pervasive concern about undmployment in the country. In fact, and this is really perturbing, a question we've asked on three successive Junes, a simple statement we ask people to agree or disagree with is, "High undmployment is going to be with us forever." We now have 62% of the population saying yes. As we came out of the recession unemployment dropped and the percentage of people who said, "High unemployment will be with us forever," went up. People see themselves in the midst of a structural change in our economy. One, where technology and technological change is part of the reason for it, so I think it is very important to keep this in mind.

Now we'll move on to a little more of the pure technology and technological change. First, a question or a proposition was given twice to Canadianc, "Canada has the ability to lead the world in new or high technology." December '82 we asked it and again in December '84. First time 69% of the Canadian population said yes. Second time, 75%. There's no lack of confidence in this country, about our ability either to lead the world in something or to cope with change. Basically Canadians throughout the country have tremendous confidence in this country's people, natural resources, it's capital resources, and above all the skill and knowledge that we can bring to bear in all sorts of problems. So that in facing the question of technological change, it's not the case that we said, "Gee, we can't do it, the Japanese are going to run all over us, or the Americans are going to run all over us in this." We think that if Canadians apply ourselves we can solve these problems in Canada.

But, and I want to start right into the substance of this, what will technology and technological change bring? On four occasions, a rather irregular cycle, December 1980 is the figure on the bottom, March '82, June '83, December '84 on top, "Will new technology and technological change and automation in the work place bring, first, a stronger economy?" Now when we started out most people said no. Pre-recession they said no, automation won't halp the economy, new technologies aren't part of the new economy, but coming out of the recession we've had a bare majority, first 52% and 55% and now 50% saying it will result in a stronger economy. They have associated technologycal change with, really a necessity, that that's part of what we have to do to face the future and they can see that economic benefit. The next one's a very interesting macroeconomic one, "Will it result in higher prices or lower prices to the consumer?" and here you can see a steady change. Over time people are saying automation and technological change are more and more likely to result in lower prices rather than higher prices so that currently we have 58% to 39% all across the country saying it's going to result in lower prices. Also on these two we start to see something I'm going to talk about later, that's beginning to emerge. The word is a little strong but it's a class-based difference in the responses. The better educated people are, the higher the status of their occupation, managerial, professional, the higher the family income, the more likely they are to say, "I think good things are going to happen from technological change." The less educated, the more they are hourly paid workers, the lower the family income, the more likely people are to say, "I'm really quite concerned about technology and technological change and I'm not sure that it's going to bring benefits." Now this is sort of giving away the punch line in part, but it's something to keep in the back of your head as I go through the rest of these slides, because that's a theme that we're going to see and one that I think has probably more ramifications for public policy than anything elese in technological change.

In this country it is almost impossible to find an issue where you get class-based differences. We may, through the imposition of technology and technological change, actually for the first time in many years, create class-based diversions in a public policy issue. That's very unusual in Canada, it is something that is very important because what it means is that different cultures are talking who are missing each other in their discussions. It means if you read the Globe and Mail, and the Report on Business, and the people who make a lot of public policy decisions about technology, if they all think it's fine and all their friends think it's fine and the media they consume thinks it's fine, they don't see any problem. If on the other hand the guy on the shop floor, or the secretary who is now a word processor, has a lot of trouble with it, doesn't like it, you're starting to see enormous divisions. Now, we're giving away that conclusion, but keep it in mind as we go.

We'll go on to the other impact. We said, "Will it improve product quality?" and here again people are saying yes it will, so that currently we have 56% to 40% saying new technology and automation will increase the quality of goods. Now, what I've done for you is take you through three economic benefits, the economy, the quality and the price of goods. Now we start into the human consequences. "Will it result in increased depersonalization for the average worker?" Yes, overwhelmingly. 72% to 23% say it will result in that. The notion that C.L.C. has talked a lot about, de-skilling, is a very real fear for people. "Will it result in higher unemployment?" Yes, 76% to 23%. "Will it result in increased need for job training?" Yes, 89% to 9%. What you're beginning to see here is a tremendously strong bifurcation.

On the one hand people are saying there are economic benefits, not overwhelming, but they're there. Better quality, you know I can now get a Super Beta VCR, or whatever, that's part of what we're used to. They've seen prices drop. If any of you own computer equipment, I mean it's absolutely horrifying. We paid $200,000 for a computer about two years ago, which we have used to death. Just the other day someone came in a said, "Oh gee, I see you've got a ..., we're upgrading ours and have essentially the same thing. We'll give it to you for $10,000." For the consumer that's great, but if you sitting owning one you're wondering why the hell didn't we lease it. But people have become used to that fact, that there are price ramifications, they see it as part of a stronger economy. So that on the one hand there are economic consequences that aren't terrific, but are probably necessary and good in the long run.

On the other hand, I'm worried about what it will do to the quality of work, I'm worried about what it will do to the number of jobs, and it means that I can't just enter a job and feel confident afterwords. I have to upgrade my skills in order to stay competitive out there and this becomes a very active demand for those increased skills. All of this I'll argue is a very mature picture. People have thought about this issue because it does affect their lives. They may not know about the details of the new technology but they have thought a lot about what it means to them as people if something were to happen and it is important to them. A footnote here: there are two responses if you don't like something that is going to happen. One is to say, "Stop it," and it may be a pejorative fut I call that a Luddite response, you know, if you don't like what the machines are doing you smash the machines. Now the Luddites in Britain learned pretty quickly that all that happened is that they brought in new machines, probably more efficient ones that displaced more mill workers. That's one possible response. "Do not bring the machines in!" "Stop the technology!" That's and impressive response.

You may say it's unrealistic but it's very impressive because it means people believe they control their own situation.

Another response is a very much more acquiescing response. That response is, "Help me to adjust to that new world." The Canadians overwhelmingly fall in the second category. Almost no one in Canada believes that they can stop technology or they can keep it from affecting them, and so they don't even consider it an option. Their response is, "Help me cope with technology." On the plant floor, to get down to specifics, it means the response is if they're bringing in a new machine, teach me how to run it, because I don't think I can keep that machine off the plant floor. But that, I think is a very important thing for you to understand. It means that while there may not be tremendous optimism, no active demand for technological change, there is certainly acquiescence to it because people view it very much as inevitable.

Now how do they feel about it though, when government gets involved? Here's a question we asked way back in 1982. We asked about government relationship to various high technology industries. "Do you think that they should help high technology industries more than others, about the same, or less?" and despite the fact that people view it as something of the future, and important to the economy, there's no consensus that that means that the government should go out of its way to help high technology industries, pour money and resources into them to the exclusion of other industries. It's a belief that, "Yes it will come, I have a little trepidation about it," but in fact if we'd asked it the other way, "Would you rather support new emerging technologies, or help improve our traditional strengths?" I'll be willing to bet a large sum that people would come down and build on our current strengths, and in fact something I was very interested to hear Ivan say is that it's a very rational approach to harness new technologies to do better that which we already do. That is I think Canadians' response, and it's not a pie in the sky vision. What you're seeing is a very realistic appreciation that it's an important industry.

Now for some of the consequences, before we get into what happens in the work place with it, I want ot show you a final thing about technology. It's two questions we asked about three years ago about the work place and about productivity. We asked people, "What contributes to productivity?" What I wnat you to see is that people are very mature in some sense. Good labour/ management relations are the thing that is most important. The amount of foreign input helps productivity because they seem to be on the cutting edge of new things. The amount of government regulation can help. Here are the contributing factors. The use of technology in the industry is seen as the thing most likely to contribute to productivity. The second is skills and training of the work force. Third, management confidence and fourth, how hard Canadians work. So there's a funny vision there that the technology and applying it to the job is very important because it's productivity and therefore success for firm, and a region and a country in many senses. And that's part of this ambivalence about it, that I may not like it, I'm insecure about its effect on me personally, but it is important. Why? Because of the productivity and economic benefits it can bring. That's not a reason for trampling over those affected by technological change but it is a reason for recognizing its importance. I particularly like to rank two relatively intangible things. The application of technology, the skills and training of the work force and even management confidence, all come ahead of kind of the brute force notion of productivity that everybody's got to go out there and work harder. Canadians have a pretty sophisticated appreciation that productivity involves pulling together all of the factors of production: capital, labour, management--everything to put it into a better mix.

Now I want to go from there to responses to technology in the work place, and what we're going to look at is a series of questions which people have responded to about what is important to them in the work place, because the one thing that all our data points to is that the concern over technology or the soft spot in technological change is its impact on people and on the work place, and to understand that, I think you have to understand what people value in the work place. It is important that one of the very interesting things that has happened in this century, is that we in North America no longer seem to be in a situation where you buy somebody's time and labour for a very substantial portion of their waking hours, where the workers are almost seen to divorce themselves from the work process, where work is very objectified. The objectification of labour is an old Marxist term. Labour becomes like a quantity and people aren't expected to derive any satisfaction from it. Today in North America you ask somebody, "What are you?" and the most likely response you would get back is an occupational category. You would tell me about your job more than anything else. Some parts of the world you get religion back, some you get tribal groupings back, some you get class references back, in North America we tend to give occupation, job related responses. So that the job has taken on tremendous significance to us in North America and not only is it significant to us, one of the most compelling things is that we now have a situation where people feel that unless they can draw satisfaction and pride from the work they do, they're going to be immensely unhappy over time.

So let's move into the work place. First we put up the folowing proposition to people and asked them to agree or disagree. "Money is more important to me than the satisfaction I derive from doing a good job or from working." A majority disagree. They said that the satisfaction is critical to them. I've presented this to management and told them this doesn't mean that you should tell employees that you'll go out and make their job more satisfying, paint the lunch room and ask them to take a dollar an hour wage cut, but it does tell you something about the norms that we have in Canada. The Canadians think it is very important that they be able to derive satisfaction from their work.

I also asked the following, the flip side of that, to agree or disagree, "My job provides me with new and interesting challenges every day." Two-thirds of Canadians, that's 65%, in December 1984 said, "Yes, my job does provide me with new and interesting challenges every day." I think that, even if it appears mundane on the outside, people find ways of deriving satisfaction from their jobs.

We then asked people for a simple trade off. "What's more important for you: higher wages or more of something else?" Number one, more job security or a higher salary. 80% to 18% of people say more job security is more important to them. Now cast your mind back to what we said were the fears about technological change. Number one fear is that it would displace people, that there would be fewer jobs as a result, and you start to see a real sort of schizophrenia about it. It's unstoppable, inevitable, it's going to displace people and that's my number one demand in the work place, the thing that's most important to me, job security. Number two, a safer and more enjoyable work environment. 77% say that that is more important than a higher salary right now. Number three, the same salary plus a productivity bonus. We once asked people, "Are you more or less productive than the average Canadian worker?" and I don't think it's a coincidence we had 72% of those on the work force say they were more productive. So for any of you human resource managers out there, if you want to invent a bonus scheme or an incentive scheme, reward 72% of your work force above average. Good luck.

Then we move into more access to job training. 56% say that's more important than a higher salary. What's really interesting here is to break it out by age group. For people in the work force under the age of 50, that figure is almost 80%, Essentially what is happening is by the time people are in their 50's and 60's the training isn't going to do them much good one way or the other. Finally: shares in the company. 50% said they'd rather have that than an equivalent amount of money. Tehn we get into greater pension coverage. The same even split. Here again is an enormous age division where as you approach retirement you start wanting the pension suddenly, or pension benefits rather than higher salary. Finally, a very interesting one: longer vacation or higher salary? Higher salary wins out by better than two to one. We asked people if they would rather have a longer annual vacation or the same number of additional days off in three day weekends, and got almost four to one saying they would rather have three day weekends.

Now, look at all this ordering and what's sitting up there at the top? Number one is security, and in people who are not near retirement age job training comes a close second. They want job training because they think their job will be more secure, not because they want the job training per se. Number two, is safer more enjoyable surroundings, so that I can derive more satisfaction from the process of work. Cast your mind back to those expectations of technological change. What have you got? Job displacement and depersonalizing the labour scene, so that the things that people now say they value most in the work force are the things which they also say are threatened by the very process.

While all of this is going on Canadians are also tremendously flexible. They're not rigid. They don't expect their work environment to be unchanging. First, "I expect I'll be changing my job within the next two years." We have pretty steadily a third of Canadians saying yes to that. 55% are on the majority side saying no I don't expect to change, but we've got a third saying they do expect change. That shows flexibility. We asked people to agree or disagree back in 1982 with the following proposition, "The type of work I do today probably won't exist 10 years from now." Not the job, the type of work. 21% said yes. That's 2½ million Canadians wandering around in the work force willing to say the type of work they do today probably won't exist 10 years from now. That to me is staggering. It means people expect change. We asked people if their jobs had been greatly affected by technology and technological change. 44% said yes. When asked how much, 48% said either a great deal or somewhat.

I want to try to sum up for you before we go on to the second data set that we've got. You see the tremendous tension. People see technological change coming, they don't think they can do much about it. They think that it has economic strenghts and it is important to the country, but they also see personal costs and costs in the areas of work life that are most important to them. At the same time they see this terrific flux going in our economy and job structure, and they want to be able to cope with it. Now that's a pretty amazing situation because it means that people are looking at something they're not very happy about, but they are willing to accept it and see it coming. The big issue for them is, "How do I personally cope, and how does the country cope as a social structure?"

Now as a supplement to this, and thanks to Jim Schneider and the C.L.C. we did a study eight months ago on technological change. We interviewed 1000 people who were in the work force, about 30% union members. We asked them about their experience and expectation of technological change. First, in the work force 54% of the population said they personally had had their jobs affected by technological change. Over half the people think that they already have gone through some technological change. Only 18% said their jobs had been effected a great deal. There's an interesting thing to go back to my theme of class responses though. The higher the status occupation, the higher the income, the more likely they were to say they had been affected by technological change. That runs counter to a lot of the popular notions that the person who's been affected is the guy on the shop floor or the woman who runs the word processor. The people who are saying that their work has been affected most ar ethe managers and the professionals. The second big category does reinforce the stereotype, and that's clerical workers. It is because the almost omni-presence now of word processing machines. People least affected are the classic private sector unionized, productive, manufacturing sectors. We also asked people what the technological change meant to them. The number one response, 34% of the people, said it had made thire jobs better. The better broke down into two groups. One group said it mad them better workers in the sense that they were more productive, but the other one said (even more people) that they now had better jobs. Not necessarily a promotion, but a more satisfying job--dead counter to many of the fears that many people have out there. The number two response, about a quarter of all the people, said the technological change for them meant either losing a job or having to be retrained. Number three is the hardware response. They said it meant they brought word processors in, it meant they brought this cad-cam machine into the shop, it meant the physical imposition. What's very interesting to me is that normally when people talk, "What does technological change mean?" to a crowd like this, the response is, "What's the hardware, what's the new machine?" Well we asked people who were affected by technological change what it meant to them and their responses were: quality of job; security of job; the type of job. It wasn't associated with the hardware

We also asked people, "What was your response to technological change?" 87% said that they were strongly favorable or somewhat favorable. Only a very small minority said they had an unfavorable or very unfavorable response to it. That's very, in our jargon, counter-intuitive because there's so much fear. We had gone into the research expecting the results to be very adverse, for many people to say it's been a bad thing, but in fact we found that for those who have lived through it, it tends to be a good thing. Despite their initial fears they said it's been a good thing. Then we asked if it increased or decreased the need for retraining. 80% said it increased the need, 5% said it decreased.

Then we asked about the impact. In each of these cases we asked if it had increased or decreased the following things. The need for training: 80% side it increased, 5% said it decreased. The ability of people to control your speed of work: 68% said it increased, 6% said it decreased. People see it as something that allows monitoring, and that tends not to be viewed as a good thing. Did it increase or decrease your job satisfaction? 59% said it increased, 17% said it decreased. Did it increase your authority or responsibility? 47% said it increased, 11% said it decreased. Did it increase or decrease your promotion opportunities? 36% said it increased, 16% said it decreased. For those of you who are doing the quick adding and saying those are coming no where near 100%, all of the rest of the people said it didn't change, and as we get down further you'll see that those are larger and larger numbers. Did it increase or decrease your income? 36% siad it increased, 9% siad it decreased. Increase or decrease your job security? 28% said it increased, 16% said it decreased. Increase or decrease your working hours? 19% said it increased, 20% said it decreased. So much for saying we're going to have a 15 hour week, and the computers are going to do all the work. That has not been the experience out there.

To summarize this, again you see a very sophisticated view. There are some bad things about it that people don't like. The fact that somebody could stare over my shoulder and tell me how fast I'm working, perhaps ever how hard. On the other hand the job is more satisfying, and there are some areas, the kind of traditional things, security, income, working hours, where they don't see a direct effect. Despite that, we asked people what they thought technology and technological change would result in in the future, and in fact there continues, despite the experience where people say it didn't effect their job security, the notion that the total number of jobs will decrease. What happens here is that only 26% say that they think there will be an increase because of technological change. 64% say there will be a decrease in the number of jobs. The really interesting thing though is that when you get beneath the surface it's all full time jobs. In fact if you ask specifically about full time jobs you get almost identical figures: 26% say there will be more full time jobs, 63% say there will be less. If you ask about part eime jobs, 55% say that technological change will mean that there will be more part time jobs, 23% say it will be fewer part time jobs. There is a real recognition of the so called electronic cottage. I don't know if you have ever used that term, but again I'll use an example from our firm. We have two associates, one in Halifax and one in Victoria, and they're both experts in certain areas and they occasionally will help us design research pieces, occasionally we'll work with clients, but occasionally all they do is analyze for us and I'll phone up Mark in Victoria and say, "Mark, we've got a study." I give him the account number, a few minutes later we see a sign that his computer has logged on and three weeks later he says, "I've got a print file," and the full report comes out. The data has been sitting in our computer in Toronto, he's sitting at home in Victoria doing an analytical job. It's hard to say whether it's part time or full time but that decentralization of the work place and the breaking down of the regular work structure is part of what people see as the opportunity and the reality of technological change and therefore they believe that part time jobs are going to increase.

Finally I want to go to the difference between white and blue collar workers. The first thing that I've already pointed out is that managers are much more likely to say they've been affected. But what's really interesting is that among those that have been affected, we asked them about their experience, and you see a very stark difference. Consistently, blue collar workers and people in service industry are the ones who say they are a little less likely to be affected, but it decreased the number of jobs. Managers will say that jobs will decrease but they are much less likely to say that, and what is particularly striking, is that when we asked what it did to the stress of their jobs, almost across the board blue collar workers said there was more job stress now, whereas the managers said yes, there was more stress because of technological change but not tremendously so. Now pull that together. I think there are aobut three or four things that we can learn from that. Number one, that we see confirmed the class differences, that the managers both are more likely to have been affected and are more optomistic about it, and think that good things have happened. People in lower status occupations, with the exception of clerical workers are less likely to say they've been affected byt when they have, are not very happy, or not as happy as the managers about what happened to them and are particularly concerned about jobs. Number two, despite the fears, after the fact, if you ask people what happened with tech change, good thing or bad thing, they tend to say it was a good thing. They have a favourable response to it, say it increased their work satisfaction so that many of the depersonalization issues with the exception of job stress, are taken into account. People are pretty optimistic about the impact. Finally, for many people it does mean a better job. When you go through it all, they're saying they have a little more authority, more variety, and in some cases more pay, and as long as they are accommodated and guaranteed job security they are happy about it.

Now I want to look at two types of responses to technological change. One is training; another is work sharing; and I'll close with views of labour unions to show you where Canadians and union members, in particular labour unions and union spokesmen stand on the question. Now, asking people who were employed if they could personally benefit from more job training, at least two-thirds of them, and much higher numbers for younger workers, said, "Yes, I could benefit." They see the change has resulted in a situation where they have to continually upgrade their skills so that they say they can benefit, and it's that willingness to do so that will allow them to adapt.

The interesting question is, "Where should manpower training be?" The most recently we asked that was in December 1984 and 61% said they would like the primary focus to be in our educational institutions. Only 35% said that the primary focus should be in the work place for employed people. Now the interesting thing to me is that that seems to run counter to some of the earlier things I showed you about job training and re-training, and what I think it means is very simple. Canadians say, "Give me the best skill you can up front, I want to go into the labour force with as many and as good skills as I can get, and theat means I want an education system that is more responsive to my needs." Once that's done, they say then, "On the work force I want access to skills upgrading, to training, to everything I can get. I see that as a necessity for my own security and advancement throught the years but I view the base as being required before I enter the work force." Finally, who's responsible, who has the primary responsibility for manpower training? The number one responsibility is to companies, then an even split, that's 47%, between the federal and the provincial governments. I think here what you're saying is an expression of who can do it best. Who has the skills and knowledge that we need to give us the training that can be most useful? What they're saying is that companies not only are the ones who will benefit, but they have the skills that you would like to see.

The next response that we had was the whole question of part time work going up, and I've got a whole other series about the structure of the work environment. Canadians think it's going to get much more flexible and in fact approve of that. This is one of the ways they see us dealing with technological change. First we asked people whether their general impressions of the idea of work sharing was very favorable, somewhat favorable, unfavorable or very unfavorable. As you can see, most recently we asked it in December 1984, and 65% had a very or somewhat favorable impression. Only 35% had a very or somewhat unfavorable impression. The interesting thing here is the tremendous effect of income. That those with family incomes under $20,000, a majority had an unfavorable view of job sharing. What they're saying to us is, "I can't afford to," or "Hey, great idea in abstract but I need every penny I've got." But as you get into higher income levels, the favorable response to job and work sharing, anything that's an unorthodox work situation, rises very very dramatically. Next we asked, "Would you personally be willing to participate in a work sharing program?" You see 61% say, "Yes, if it were there I might consider it." That doesn't mean they want it now, but they're willing to think about it and again a tremendously strong income effect. People who are poor say they can't do it because they can't afford to. We also asked of those whom we interviewed what their work status was. You can see that a slim majority was full time, 34% were unemployed, 14% were employed part time, so that there were approximately four times as many people employed full time as part time. We took the part timers and asked them, "Why are you employed part time?" and you see a majority, overwhelmingly women, 58% who said, "I am employed part time because I prefer that, I want part time work." 30%, most of whom were men said, "Because I can't find full time work," 12% said they were working part time and attending school, a somewhat different category. The point that I'm trying to make here is that people see a situation where technological change opens up all kinds of avenues for different work structures. But when we go through the numbers we find that while there's an abstract willingness to work in a different work structure, it would be nice to have work sharing. You get down to 58% and 14%, that's about 8% of the total population, who are working part time because they want to work part time. The active demand for a radically different work environment isn't really there.

Now I want to do a bit of a summary, because if you view part time work as an adaptive change to technology and technological change, it is not one that can be imposed. It has to reside in people's desires to be an effective change for a radically different work structure. People say, "In the abstract, a grand idea, and if we have more time or less employment work sharing is a terrific thing." But it's getting people to volunteer for work sharing. Who wants to share their jobs? It turns out it's a pretty small segment. Iwould argue that that's something of a false hope, that this job displacement work sharing will solve that problem. There aren't enough people who want it for it to be a real solution.

Now we go into labour unions. I want to close with this because of the nature of this conference. What I want to give you is a sense of where people think labour unions are doing a good job and a poor job so that you will have a better feel for how they're understood and how they're viewed on this as well as other issues. Firse, I've got something that we do in our quarterly. I have a large number of various institutions, and we ask people how much confidence they have in the people who run this tremendously long list. You see right at the bottom are the unions. People have very little confidence in unions per se. Workers have a lot of confidence in their local, moderate amount in their union, but by the time you get out of the labour movement you have very little confidence as opposed to a huge hierarchy of other institutions; the cicil service, the government, multi-national corporations. Unions start out a debate like this with a significant disadvantage. They're speaking from a position where people don't understand, first, why they're speaking, and don't have a lot of confidence in them as a valued and important contributor to public policy debates. They're seen as being very self interested. That's a tough piece of news to tell a labour union, but I'm afraid it's true, and up until recently there wasn't much difference between union members and nonmembers. Of late union members have begun to have increasing confidence in the union movement, but that's a new development over the last year and a half.

At the other end of the spectrum are high technology companies. People say they have more confidence, and place more confidence in those than any other company or type of industry we measured. So when unions are talking on a subject of technological change, you are looking at the social institution people have the absolute least amount of confidence in. Talking about a subject that is the home territory of the companies in which the public says they have more confidence than any other type of company. That's a very hard position to be in if unions are to take an adversarial position, because bluntly, they won't be believed. They will be seen to be self interested and not acting out of a public interest.

Another question, then as a result: you can see hostility to unions. 53% say unions are too powerful, but 41% say the role is important because they must protect workers from exploitation, more even handed but you see still a pretty significant opposition to unions.

Finally we asked about union performance. "Do they do an excellent, good, fair or poor job of working for their members in getting higher salaries?" 65% said they do an excellent or good job. In getting increased job benefits, 64% said they do an excellent or good job. In promoting a safer and more enjoyable work environment, 61% said they do an excellent or good job. In improving job security, 60%; in increasing access to job training, 43%.

To pull that together for the union people what you're seeing is that unions are seen as doing the best job in the things that are least related to people's concerns about technological change. The best job is wages and benefits, the area that they're doing the least well on, access to job training and on job security so that on the issue of technological change not only do unions have a problem because they are associated with conflict and adversarial position but even looking at unions, unions have a real problem because they are associated and seem to do a good job in areas that aren't bound up in what people are afraid of: technological change. All of this is a way of saying that unions have a real obstacle if they are to take a strong adversarial position in the whole question of technological change. The problem revolves around one sided credibility and second, perceptions that that's not the sort of thing they have traditionally cared about or done a good job in. In other words there's a lot of ground work to make up.

Now I'm going to try to pull this all together. Number one. Technological change is seen by Canadians as being inevitable for two reasons. The first one is that they don't think they can stop it. The second reason is much more optimistic, it is because it is important to the economic future of this company, this country, and therefore my future, and that Canada has the skills to adapt. So it's something that's going to happen. Stopping it is not an option and not an answer.

Number two. There are a lot of concerns about it and those concerns plumb really important personal concerns. One, the fear theat jobs will be lost. Two, the fear that the quality of the work life and work place will deteriorate. That lies at the root of an awful lot of the insecurity and uncertainty over the whole question. The interesting thing is that if we contrast those who have experienced technological change with the general population there is still the fear of job displacement, although we talked to the survivors. The number one response was that it actually improved my work, gave me more responsiblilty, made it more varied, more interesting. A lot of that may be that we've been talking to more senior people but in that sense the concern about a deskilled ghetto, or about boring or repetitive work doesn't seem to hold true. It is something that's very important, particularly the monitoring and the respect that people gain seems to be a sub-theme that causes a lot of problems.

The ramification of all of this is that people want a responsive work environment with technological change is introduced and responsive in two senses, one, that they are consulted, they are involved in the decision, that it isn't brought in in such a way that the quality of their work life is dramatically altered without their being able to have a say in it. The second one is that they want access to training, it is just a security device.

Finally, there is a deep class division on this. That's very rare in Canada and I think that if this really comes down to a crunch, if people become more hostile to technological change, we're going to see a wasp-waisted situation. We have traditionally had a pyramidal work structure. Up on the top the managers, the professionals, the people who can now get access to more information, the information workers who analyze and manipulate data will say this stuff is great. I can sit at home in Victoria and access gargantuan data bases in Toronto and I don't have to plow through the slush. I can sit here in Victoria and enjoy tea and nice weather and a great quality of life and this is terrific.

At the other end, people who feel this is being imposed on them, makes their life more threatening, and they're not convinced that it's more fun, and they're bing more closely monitored. That to me is concern. That increasingly we'll have responses to this change divided on class lines, and people won't talk to each other and that will make the issue divisive, it will turn it into a political issue. You will see tremendous demands for the government to intervene, protect the quality of life, just stop this technological change. And the role of the unions in this is to recognize that they have a very important responsibility to look after and protect the interests of their workers and their members. In doing that they have to make a realistic appraisal of first, what it is their members are afraid of, what they want and what the real life experience will be like for them, and secondly, where they stand in the debate. This is a debate I think that is just starting. It's going to heat up over time and I hope that this background for you gives you more information so that you can go away knowing a fair amount more about what it means for the individuals who are affected by the technology, because that's what matters in the end. It's not whether there's a great new silicone chip. What really matters is how it affects the individual at home and in the work place.

Jim Schneider:

First of all I want to debunk the myth that I am an expert on technological change, or for that matter that many of us are. I don't think that's really true, and I think that's part of the very nature of some of the insecurities Ian MacKinnon referred to that affect us all related to the issue. What does it really mean, how do we really cope with it, who gets affected by it, who pays for it, who gets the benefits? And it's to some of those things I want to address my remarks, perhaps coming briefly from two different angles. One is related to some of the issues and the data that Ian raised and the other is from some of our own internal experiences with in the labour movement.

So first, from the survey data, I want to make a few key points. There are many issues involved here but I want to make a few of what I think are the key points. First, even before our particular survey which Decima did for us, even before we get into the issue of technological change, we asked the question, "What do you think is the key economic issue facing Canada right now?" The overwhelming percentage of people identified job creation as the issue. So the issue stands as an important thing for most Canadians above and beyond their particular preoccupations with this one dimension of it, which is technological change. That was reinforced in different ways in this survey. In fact, somewhat at variance with the general rosy future people tend to think will emerge eventually from the infusion of technological innovation in the work place and in our society, broadly speaking they really don't believe that ultimately more jobs will be created. When you combine the concern about job creation with the fear of job loss, with the recognition both bvy those perhaps to whom it has happened and those who have seen it happen to others, of a shift from full time jobs to part time jobs you begin to sense fears about whether or not they are going to be retrainable on the new technology, concerns about deskilling and losing job satisfaction, you begin to get a feeling, beyond the statistics and the numbers, of the kind of insecurity that this particular thing causes in working people. Those who get more satisfaction and those who get less of it. I'm not going to spend a lot of time dealing with those other issues like stress, like deskilling, like health and safety implications, mostly because of time but also because I want to focus in on one thing, because I think it will get us closer to perhaps what some of the real implications are. The other thing I want to do on the data is spend just a few minutes on a few of the things Ian left for me to make some points on.

Number one is how people feel about who should pay for the adjustment, and I'll only quote some of the figures on it and I don't think they're misleading. Ian, I know, will correct me if he feels that they are. 62% believe employers should pay all or most of the costs of early retirement benefits for workers dislocated by the impact of technological change, forced into early retirement for example. Roughly 65% believe that employers should handle all or most of the costs of retraining, 59% actually believe that employers should give termination pay above the maximums required by law in the event that somebody has to be terminated because of the impact of technological change. Now these are significant because I wouldn't have expected necessarily that this would have been the response. It tells us something about the continuing and abiding sense of fair play out there in the general population about who should get affected, who should pay, and who should share in the benefits. Most people in fact felt that empolyees should not be penalized by the innovation of tech change and surprisingly most also believed that a company shouldn't receive a tax break from government for technological innovations that eliminate jobs. That's a public policy consideration that I think has some implications.

On the flip side, who should receive or who should share in the benefits from technological change? Most of those kinds of things I just mentioned are reinforced. 66% believe that workers, among others, among employers and consumers and other parts of society should benefit form the productivity increases. There's still a lot of uncertainty and Ian got close to some of it on the work sharing stuff, around how that should be shared: should it be shared in more money; should it be shared in less work time; should it be shared in a variety of other kinds of ways. There's still a lot of indecision out there on how it should be shared, but there's pretty solid support for the notion that it should be shared.

When it comes to legislation and collective bargaining issues, and I've related to some of the collective bargaining around who should pay, about three-quarters of the people surveyed felt that tmployers should be required by law to give advance notice on technological change to their employees and roughly the same percentage felt that employers should be compelled by law to bargain the impact of tech change with their employees. Essentially people generally feel on this issue that there's a role for unions and there's a role for working people in the process and if there's no other way of achieving it than through legislation, then that indeed should happen, and I think that's a fair interpretation from the data. Since we're beginning to talk about unions and not in contradiction to what Ian said, I do want to make a couple of additional comments ant they may not be consistent with all the data but they certainly come out of ours. One of our specific questions asked what your overall impression of labour unions was, and I think the responses were very favorable, favorable, unfavorable, very unfavorable, but no response or no opinion in the middle. Now 54% responded favorable or very favorable, and that's part of a trend in terms of the impression of trade unions in general, not necessarily on this issue, but in general, that has been emerging in the course of the last seven years. It would be nice to find that out because we don't usually get that kind of news. We usually get the news about issues in which we don't have a lot of credibility at all, and I think that's important for you here who are trade unionists and for those of you here who deal with trade unionists. I think it has something to do with the economic situation in this country and I think it has something to do with this issue as well. In terms of credibility on this issue, the majority felt that employers were most credible, that the information that they put, when you look at three groups: employers, trade unions, government, they felt that employers were most credible, that the information that they passed out about technological change was the most credible. But they felt that the government was the least credible and again that's somewhat of a surprise for us to not be the least credible in something.

I think it's important to remember what Ian said here in the beginning, the results of surveys, of polls, are maps, they paint a bit of a picture, they don't necessarily describe reality entirely and they may give you some hints on where to go so I'm not trying to mislead you and mak a case here that there's been some kind of an overwhelming turn around out there in how people feel about unions, but it may not be in the current economic climate quite as dismal as you would tend to think it would be. Finally, it's also very important to us, at least as trade unionists. It confirms some things that we thought might be happening. A lot more trade unionists than most people think read union publications, a lot more members of their families read union publications, a lot more people than in the past are getting some kind of union message through their organizations, through their local and their national unions. That tells us something about the job we're doing at one end of things in terms of communicating, it also tells us something about a vehicle we probably should be using a lot more effectively.

O.K., that's sort of coming at it from one angle, the angle of some of the survey information, especially focusing in on some of the issues related to jobs, job security, income security. The second phenomena which I think you'll find interestingly related to it is the evolution of trade union policy to deal with technological change itself and that is an evolution that's been taking place now for seven or eight years, not that no one ever spoke about it before, but in terms of the amount of times it became an active policy consideration at conventions, both of the congress and of its affiliated unions and of federations of labour like you have here on P.E.I. What's important about what I'm going to tell you here is how policy gets made in a trade union movement. Over the last several conventions at the congress level, with a great deal of support from the affiliated unions a number of specific policy positions were taken related essentially to the two historic main vehicles of labour movement for coping with the issues in front of it, one of which is collective bargaining and one of which is either lobbying or through direct political action dealing with legislative reform.

On the collective bargaining front the priorities that emerged were: longer notice for people dealing with the issue so that they could have a role in determining its impact on the work place; the right to bargain built into a collective agreement on the impact of technological change in the membership; job and income guarantees for people impacted upon by technological innovation; mandatory retraining at employer's expense, something I think is to some extent reinforced by the findings of the poll. What I'm trying to do here is paint for you a picture of our experience of it and how closely it conforms at least to some of the things that stand out in the survey data. A focus on shared work time, wnad we're still trying to do our job on that one. We haven't necessarily reached a total consensus in the movement on that but there has been some progress in that regard. The right to participate in the actual design of work place innovations so that it isn't just a question of bargaining on how it's going to affect your pay, or your security for a job, but also in how it's going to affect your direct work environment and specific working conditions.

At the same time we've developed some policy related to issues that are of legislative concern focusing primarily I suppose on labour legislation. It shuld be a particular concern to you here on P.E.I. and I know it's some risk coming not only from outside of P.E.I. but when you come from Ottawa, to make any suggestions and I realize that, but you happen to have one of the provinces in this country that does not have one word in this labour code designed to protect workers from the impact of technological change. Not one clause, which is a condition which obviously does not need to exist. You shouldn't feel overly personally bad about that because there are only four jurisdictions in this country that do have in their labour codes clauses designed to at least help protect workers from the impact of technologica change, and that's the Canada Labour Code and the labour codes of Manitioba, Saskatchewan and British Columbia. Those codes were reformed over the course of the last 10 years, and I'll let you figure our under which governments that took place. In the legislative arena we're loking for reform of the codes to provide at lease a minimum notice of one year, and of that 75% who indicated that they thought that there was a legal entitlement to advance notice, it's interesting enough that about 64% thought it should be from six months to one year, which is a lot closer to what we would have said than I would have thought the datawould have been. We asked for minimum notice of one year, no restrictions on the right tc bargain the impacts of technological change, a very broad definition of technological change which isn't so narrow that it only catches the most blatant kinds of innovations that take place.

Outside of labour legislation itself, every government of this country states and designs programs that ocnsider the goal of full employment to be the single most important economic goal of the nation. No tax concessions, this was in our policy long before the survey. No tax concessions to the companies who use technological innovation to eliminate jobs, the reform of the training system to focus especially on those most affected by technological change as workers, and that's older people and women and those who don't have a job yet at all, the young people trying to get into the labour force, improvement of health and safety standards related to technological change and the expansion of pension systems, expansion of public systems and reform of private systems to help again get more access to retirement benefits to more Canadians, especially bearing in mind the impact that this phenomenon is having on the older worker.

Now those things will be boiled down to a worker's technology bill or rights which keys back in I thinking to the findings of the poll. One, I want the right to a job, two, the right to share in the benefits of technological change, three, the right to know it's coming and participate in its implementation, and four, the right to security of income and of a future. The reason I sort of went through those two separate phenomena was that I think they're both measures in relationship to this issue of the same fairly borad based concern out ther among workers about how they're going to get affected by this issue. It's no accident that many of the policy priorities of the labour movement receive a great deal of support from the public. Because most of the people out there inthe public are working people who have experienced or seen somebody else who has experienced the impact of technological change and they're worried.

What we did five years ago really was decide that our first priority was in education, in educating our own membership and in helping them bring the issue to the public and it's partially my role as national coordinator of educational services that I've gotten involved in the issue. We've done a great deal of education across the country. Your federations have held conferences, many of the affiliates run programs in it and I can't help but think that at least the terms of that particular thing in this particular issue, you who are trade unionists out here have been doing a pretty good job. I don't think it's an accident. I saw a big switch over five years as a labour educator. From the first course I gave on tech change where everybody was interested in the issue but virtually everyone in the classroom felt it was going to affect someone else. It wasn't going to hit in their industry, or wasn't going to hit in their particular work place, or they were in a position where they wouldn't get affected directly by it even if it did come in. In more recent experiences, virtually everyone comes to those courses because they have been affected, beacuse the people they represent are being laid off, or are being deskilled and every one of them brings a real solid tech change related issue, and I don't think that's an accident that that's changed or that the results we get from the survey are what they are. What has been confirmed, when more recently we went out to find our, having said all these things and having talked about it among ourselves for so long, if there is any chance at all that the public sees any of this wht eway we do, and it turns out that the public sees quite a bit of it the way we do. So while we may not yet be credible on the issue when we speak about it in public, we may not be credible yet to politicians, our wave length is very ocnsistent with the wave length of the general public and it may simply mean that we haven't spoken up early enough or often enough and that's one of the messages I'm going to leave with you.

I guess finally I want to talk a little bit about the polarization, on the movement towards more of a class attitude on this issue that Ian briefly focused on during his remarks, because I think it is important and I don't really think it's that surprising. The movement after all was born historically out of that same phenomenon that Ian referred to earlier, the pain and the dislocation of the industrial revolution and while it's had its ups and downs in history it has continued to exist, and the membership, like that of any other institution tend to rely on it more in times of crises than they tend to rely on it when things are going well. We live in a society, and I don't think this is particular news, in which people have lost faith in the political process. Fewer people vote, most of those who do vote will tell you quite frankly that they don't know that it makes a hell of a lot of difference. I'n not that cynical about the process, but it did occur to me that if Ivan Blake was feeling insecure because governments were always marching to maximal efficiency, and he wished that they were a little bit more hman like himse.f, that they made mistakes and bumbled a bit, this was the point where I wanted to reassure him that at least if our government in Ottawa is any example we either have a government who is not marching to maximal efficiency or we have a government that's clearly one of the most human in history.

In the final analysis the issue and the alienation that people feel related to it, I think, comes down to a basic value we all share and that is that an individual's own sense of worth, how they feel about themselves. This is really the force that's at the root of human strength, at the root of human dignity and for that matter at the root of the human potential. Semms to me that any society, the small or the large one, that allows that sense of worth to begin to erode without dealing with the conditions that cause it, does so at its peril. The last thing that Canada or this province needs is further fractionalization among our population on issues and matters that concern us all. What you can lose in the statistics and the survey is that when you say only 16% think this, or only 22% think that, you're talking about percentages, but what you're also talking about is a million, a million and a half, two million people who sense that their own worth has been eroded because they feel they can no longer control the conditions under which they work. they feel they can no longer have any guarantee of security of income no matter how well they produce or how hard they work. They no longer are sure that they can project a future for their kids in which that kind of security will be possible, and if that isn't going to the brink of eroding the confidence of the ordinary person in their own human worth, I don't know what else could define it more clearly.

So I guess in wrapping up and in starting as we did in the movement, with values, I suggest that one of human dignity and human worth and human potential is as close as we'll ever come to consensus throughout this room. If we can start with values, having moved through our prior experiences and the one today related to opinions and attitudes to behavior. I'm going to leave you with a couple of suggestins which may stimulate some discussion later on, to the trade unionists here. First thing I would say, with one exception, is keep doing what you're doing. Keep educating each other on the issue. Keep raising it in front of the general public and if you haven't been doing that, start doing it and do it very loudly and very clearly because the general public does strike a chord with us in this one. Keep the issue at the top of the bargaining table , or put it there if it isn't, because the public does really believe that employers have some responsibilities in this issue and you do have some apparent support out there. Keep it in front of your politicians, because the public does tend to believe that you're entitled to some security under law for the impact of technological change and if they don't respond to it find some new ones who will. The whole danger of this phenomenon lies in its capacity to erode our confidence in our ability to cope with our own destinies. You do have some choices. There are not as many as some people would lead you to believe but you do have some choices, and one of them is at the ballot box. Secondly, to governments, those who might be elected by people in this room and those who are not, it's way past the time where the minimal requirements of public leadership oblige you to build in legal protections for workers into your labour code and into your other policies. There's public support for it, it's a public business. It's time for the government of P.E.I. to sit down and consult with trade unionists and other workers through their leadership come up with amendments to the code that the people of this province would feel very comfortable with and would protect workers, especially as you go into it more thoroughly, from the impact of technological change. There is no reason why the people in this room can't make sure it's done.

Finally, to the employers in the room, reconcile yourselves if you care about whether or not those class divisions become more pronounced or not. Reconcile yourself that one of the ways it's going to happen is that you're going to come to the bargaining table and deal with this issue in good faith. If technological change holds any of the promise that many of us think it does there's enough for all of us to have a fair share of it and there's enough for its impact to be worked out through time so that it doesn't hit that 16%, 18%, 20% of the people who are out of work, unemployed and who are tremendously insecure about the impact this will have on them. I think that's a fair agenda. It requires work from all of us. There's no reason whatsoever why this island province, as it did at the beginning of Canadian history, can't take the leadership role in putting us all back on the right track in terms of technological change.

Don Livingstone:

First of all, I note on the program that we now have a new name for our company, named Osland Telephone Company, and I can assure you that if this is the result of tech change we still need that human touch there to ensure that we are still Island Tel, which we are. A lot of things that I'm going to touch on came out in the Decima survey as positive feelings by a number of participants that were surveyed cross-country, and I plan perhaps to relate them to some of our own experiences within our own company because, being the largest company of the province, we've been involved in tech change for a number of years.

Tech change is nothing new. It goes back in our company probably until almost the birth of the company and we're celebrating our 100th anniversary this year. It starts away back with the advent of microwave which replaced sub-marine cable to connect our services to the mainland. We had a transition from the technology of aerial wire to cable, both aerial cable and buried cable and cable carrier and finally of course more recently, moving into the fibre optics role. We went also from manual operation of switchboards to dial, and with the advent of these changes that took place, people are affected. They're affected not only in the work place, but they're affected throughout the province. These demands for the things that occur, such as those that I've outlined, and numerous others--one of the key ones of course that I think you've all experienced was that we had rural lines where many had 20 or more customers a few years back, and now we're down to a level of four per line. Of course this is not good enough in today's environment and we must embark on new programs to improve that sort of thing. We've also experienced consolidation of offices which everybody has experienced in most other organizations and companies as well. We've seen the change from manual labour to hydraulics in our construction crews where we've had seven men crews go up to two man crews with the advent of technological change in the equipment we use, and we've gone from mechanical to electronic offices. The long distance call of course is probably the most traumatic anybody has experienced and you'll recall back a number of years ago when you'd go to place a long distance call it was not unusual to end up with five different operators to make the connection from the time you started in a rural part of P.E.I. to maybe a relative in Boston that you were calling.

The transition for the change that has taken place with respect to this technology was not initiated by the company. The company did not make these changes. The customer demanded the changes and forced the company to keep pace and to put in improved equipment and make these transitions to keep up. In our business transition and change are a way of life, and I guess the only thing that's constant in our business is change. We're continually changing. As a result of change of course this involves people learning new skills, it involves training, and we have been heavily involved in that over the years. Somebody said not too long ago that looking ahead, when many of us started out in one career when we got out of school or college and we pursued that career and stayed with it for a lifetime, that today most people will have three careers during a lifetime, and this is a major adjustment for many of us that are senior. We find this hard to understand and perhaps to cope with, but I think it is a way of life and I think that with the changing technologies that have been indicated here this morning, presented by Ivan Blake, what's happening in the year 2000 and beyond, we must adjust to this. We've got to adjust to change, we've got to adjust to re-education and training to find the new skills, to find the jobs and keep employed. Throughout all of this that has taken place over the years there has not been a significant decrease in manpower or in people. There always seems to be something to come and to take its place. No matter what kind of a transition we've made, there was always something else to backfill to provide employment.

I realize the statistics that we heard here this morning are national in scope and they reflect a percentage of people who were talked to on P.E.I., but primarily what I'm addressing is the Island scene as I see it, from my perspective, from my company in P.E.I. I think that change or transition through technological advances can be dealt with and handled, if they're handled properly. I think we have to be concerned with the human element and what happens, what takes place when major technological changes take place. That was Ian's second point, his concerns about tech changes, and people of course have major concerns about the jobs that will be lost and they want access to training.

I happen to be involved right now, or the company is involved, in a major technological change, one of the most significant that we've had over the years that affects a number of people and many of you have heard of this and know about it. It is what we call the introduction of zero plus dialing. Now this is a technology that is being used in every province in Canada. We happen to be the last one to embark on this technology but it is in demand and is being used in every province in Canada whereby customers can do most of their own dialing in long distance calls. What does this do? Well, of course it eliminates some of the work for some of our telephone operators. We had demands and pressures on the company to proceed with this program which we have started to embark on and is currently under way. So what happens when you have something like this? It's going to have a significant impact on a number of people, a number of lives, and a number of employees and I just want to relate to you on how we are coping with this change, what we're doing about it and the impact that we hope it will have as a result of what takes place.

This particular change to what we call TOPS (traffic operator position system) will take place next fall. When we first knew about it and studied it, we studied it several years ago of course and made a decision a year ago last May that we would go ahead with it. The minute that it was approved by our board of directors as a major project that we were embarking on two and one half years ahead or beyond, I immediately sat down with all of the employees, anywhere from groups of one to four, and I talked to them to indicate what was happening two and a half years up. Our agreement I think states that we should give six months notice. I particularly thought in this case, we're involving a number of people, a number of jobs, and I think the more notice we can give in this particular case the better. It would enable us and the employees to do something together jointly to try to alleviate the number of jobs that would be phased out. So we did that. That was in May of '84, advising them there would be changes in jobs for some 20-25 people, effective November, 1986.

During my discussions with these people I tried to determine what their needs were, and what their feelings were with respect to their jobs and the future, and where they were going and what they were trying to do, and many interesting things came out in those discussions which I recorded. Many of the people that were in the jobs that they were in wanted to be a telephone operator as long as they lived. That was the job of their choice, it was what they knew and what they liked and they did not really wish to change. Many others would welcome the opportunity for retraining into other jobs and we discussed that at some length and after interviewing all of the staff, 60 employees, we then decided to embark on a retraining program to try to find some new skills for these people. Working closely with Holland College, we had interviews conducted, career counselling conducted with the girls at the work palce and decided to allow anybody to enroll in whatever course they desired for retraining. It did not have to be related to the telephone company, it did not have to be related to what we were doing. I indicated at the time that I met with them that I could see an expansion in a certain area of the company with respect to a new area of finance that I was planning to open up and that we would be creating about ten jobs there so it would mean that eventually ten of the 25 would end up with new jobs. It was my hope that with retraining that we could find places for these other fifteen. So our objective was to get on with the training program that could achieve this.

The results to date on this program is that 30 out of the 60 people that were employed have completed at least one of the ten different courses in a non-related field at Holland College. Nine of the girls have had work experience of two to six months in other departments of the company when we had opportunities for backfill for people who were off due illness or pregnancy leave or something like that. We transferred these people over and gave them the work experience in other areas of the company so they could benefit from that knowledge. We've been able to take six of the employees, or 25% of those that would be affected by tech change, and we've placed them in permanent positions already and this is more than one year before any jobs will be phased out. As I indicated earlier, the company has plans to create ten new jobs in another area and we are presently working on that.

The training was the cooperative effort between the employees, the union and the company. The girls did the training on their own time, the company paid for the cost of the training, so that the fact that a number of the courses were done at night and a lot of our staff work shift work, meant changing shifts and adjusting that. The company was very flexible in allowing people to change, and in making the changes where necessary so the girls could participate in this. As a result of this desire by the employees, and it was not forced by the company at all but was a voluntary thing, we simply provided the vehicle in working with Holland College and that opportunity for them to enroll in courses. Half of the 60 had retraining, 25% of them have got permanent jobs. My overall objective was to have every employee trained so that they could find work either in another job with our company or with another company, and hopefully they could remain on the Island. Most of these people that I talked to were from P.E.I. and they wanted to remain here, so the company objective was to try to retrain those employees so they would all have jobs come November '86. I'm still very optimistic that this can happen. I'm encouraged that we've got 25% of them with permanent work and it's a year down the road.

This meant considerable expense to the company. It meant that we had to bring in people to allow people to go out. It meant that we had to backfill these jobs and bring temporary people in, and did cause some problems there. The transfers that we experienced with respect to moving people into jobs on a temporary basis, some departments had difficulty with that, but nevertheless it gave these people the opportunity to have a different work experience within the organization. A number of these employees have quite a high number of years in our company, but as a result of that experience, when the permanent opening came up, in several cases the manager specifically asked for the girl that had that particular experience and she was able wo work in the new work place.

This could not have worked without the cooperation we had with the union. In our organization we have two unions, and we had good cooperation from both of these unions with respect to the cross-training, because some of these people were moving from one union to the other union and the acceptance by both of the unions was very important to this whole process.

Looking ahead, with respect to tech change on the Island and what the effect is going to have, and the implications for P.E.I., I personally am very optimistic about the future and what tech change will bring. I'm optimistic about jobs on the Island and I think that in order for us to achieve and keep the people employed that are now employed and try to employ more people, we have to be innovative. We have to think of things that aren't being manufactured here that could be manufactured here, and if it's feasible to do it, we should be exploring that area to try to create jobs, because we are in a high unemployment area of the country and we don't have a large base of industry so it's up to us to try to be innovative in our thinking and develop programs, resources, that can employ people. We've proven in the past that we have excellent people. We look across the country and we see that the people that we have exported have done well throughout Canada and various parts of the world. We know that we have the brains. It has often been said that one of the things we export is brain-power, and that's been very true, and we should attempt to keep this here as much as we possibly can and develop, where we can, jobs to keep people employed. But it requires innovation in all of us. It requires cooperation between companies and the unions. If we don't have two way dialogue and good communication then this won't happen. And it involves continuous retraining. The training never stops because one leaves school or college if you're in the high tech business as I am. It's just constant training, they're continually training to keep pace and this is part of the business. The same is true in many of the other organizations that people are involved in. Training is a way of life. It is something that we must never stop from the time we start working until we retire.

It also means flexibility. We must be flexible in our thinking in regard to job change and this isn't often easy for many of us who have gotten in a rut, in a fixed job, but I think with what's happeining in the future and the number of jobs that are going to come along, we must be flexible to think and try these new jobs. I have talked to one of these operators that I had talked with back in May of 1984 and at that time she told me that the only job she wanted in her lifetime was a telephone operator. Since this training that she has enrolled in she's got a new job now. She didn't realize how different or how enjoyable a new job could be. Her whole view has changed because of an introduction to new training and new skills, and a whole new world has opened up for her, and this will happen for many more.

Another thing that we have to have, that we have to encourage people to have, is mobility. People may have to move. You may have to relocate to keep employed and we've seen that happen many times in the past when people left the Island as soon as they got out of school or college, the first thing they'd do is be off to Toronto, or off to the west where the fields were much greener ant that hasn't always proven so good in the immediate past, but there are chances that you will have to relocate or that people will have to relocate because of the job skills and the training. Depending on the vocation chosen and the number of jobs in that particular area, it may be necessary to relocate, and I don't just mean from Summerside to Charlottetown, or Charlottetown to Summerside.

I think if we're flexible, we're mobile, we continue to train ourselves and upgrade ourselves on a regular basis, and that we have, most of all, cooperation between all: the company, the employees, the union, that we can make it work and we can have a very optimistic outlook with respect to jobs and tech change as we move into the latter part of this century and into the next one.

Marc Zwelling:

I presume that in the organization of the conference on technology, at some point, someone said we need a vision of what the automation of the future can look like, and we need a vision about what people think about all that and we also need some information on how quickly the technologies that are possible, are likely to come into the work place, because that's our major preoccupation today. So I thought one thing I would be able to do is help to fill in the details. Ian MacKinnon's presentation and Ivan's presentation this morning reminded me of the story about the American humourist Will Rogers, who was apparently giving some advice to Franklin D. Roosevelt during the second world war before the Americans had entered the war and the German submariners were patroling the Atlantic and really controled the sea lanes and F.D.R. said, "I wish we could do something about all this, I think it's going to drag us into war if they continue to operate this way and affect our allies," and Will Rogers said, "Well I have a great idea. All you've got to do is dump sand in the German submarines, then they won't be able to get out of port," and F.D.R. said, "That's a brilliant idea. How would I do that?" Will Rogers said, "Well I gave you the idea, I'll leave it for you to work out the details."

Many of the speeches you hear at conferences like this sort of end that way, which is, "Well if we have some labour/management cooperation, if we had advance notice, if we had retraining, if we had legislative action, if we had the kinds of other progressive programs and new steps and ideas in place, we'd be able to solve these problems and people would feel more comfortable about it." Then the speakers walk away and leave you to work out the details. What I'm going to try to do is give you a way to work out the details. I do a good deal of public speaking and it's very flattering sometimes when people say, "That was a really interesting speech," but it's more flattering when people say, "That was an interesting way to think about something." That's what I want to do this afternoon in the short time we have available, is try to find an interesting way to think about this problem of the technological change challenge in P.E.I.

To begin with, I have prepared this questionnaire. The basis of this is that I was invited here, I presume, because of my experience in doing some planning and some forecasting in technology and some other areas. Forecasting and futures research is for me a tool, one of the things that I use because some people come to me with different problems, and you can't have only one solution. Occasionally we say, "Well I think public opinion research is the right thing to do," or occasionally in my little company we say, "Well we should do some advertising, we should do some communications work, or you need some training or it's leadership development problems, maybe you need more research, or maybe what you need is more forecasting or better planning." I presume your major interest in coming to the conference today is finding out what's going to happen, and what's going on. So I'd like you, if you haven't had time, to just take literally two minutes to complete the questionnaire. If you want it back, put your name on it. It's not a right/wrong kind of thing, except in one question where I think I've got the accurate answers.

In forecasting technology, I tried to think of something that made some sense to P.E.I. in forecasting where we could be really useful, so at the end of the day you could walk away and say, "I've got a handle on it," and I thought up the causeway or tunnel proposal. Surely that is major technology that would change the way life exists on P.E.I. It must result in some change or else why has the idea been kicking around? Apparently, a number of years ago, the causeway was actually started. Some property was obtained, or treated, or improved, or something in a way that would enable a causeway to advance. Seems to me that's one kind of technology, one kind of technological change you can forecast. It exists now. It's possible to have a tunnel, it's possible to build a causeway. The question of course is when do we do it? Do we want to have that kind of technology in place? The second part of it is the question about where people work right now. In forecasting it's very important to try to get the outlook right for the next year, or the next five or ten years, and the work that I get involved in very often goes 20 or 25 years out, but what you're always teying to do first of all is get a very accurate reading on where we are today.

Demographics seemed to be an interesting topic to help explain the technological change or give you a way to evaluate the speed of technological change. Public opinion polling has some predictive value, but because attitudes and opinions are pretty fluid and change quite rapidly, even during the year, as you see around political campaigns and elections--at the beginning of the campaign it looks like a sure thing for one party and the rules change later on, public opinion research is not necessarily a very good way to forecast. It is one of the tools that is sometimes useful. Sometimes you can't ask people things they don't know very much about.

One of the key things that people look at in demographics, which is the study of groups of population, is the birth rate. It's a key kind of concept because once you know the number of people in a certain age group, once you know something about the rate at which they're dying, once you know something about the rate at which new Canadians are arriving through births and through immigration, you can forecast very accurately for a very long period of time because all the people are here. If you want to make a forecast on P.E.I. about the number of elementary school calssrooms we need, you'd understand that by understanding how many children are being born this year, what is the rate is immigration. Sounds kind of obvious but in fact many governments until quite recently didn't do any forecasting like that and there was always a surprise in September when school opened. People said, "Oh, we didn't hire enough teachers," or, "Oops, we have all these teachers and look at all the empty seats we have." Population forecasting has been an extremely accurate kind of forecast because the folks are all here. Now unless there is a holocaust or some other kind of catastrophe that just wipes out the population of the country, or the Island, you can forecast over a long period of time when you know something about the population. From a demographic view point, population is more important in determining the future than technology.

This morning Ivan mentioned in his quite brilliant list (I thought), some key technological advances or changes through history thad did change the history of the world. Sometimes the technology was really quite simple. He had a sense I think of looking at the population, looking at people, looking at markets when a company talks about selling a product or whether they enter a new product or whether to improve something they now sell or make. They're looking at markets which are nothing more or less than people, but because so many of the things we do as Canadians and as Islanders results from doing it at a certain age, we can use our understanding of the population and how old or young it is and is likely to be, to forecast some of the driving forces behind technological change, behind social change, behind political change. When all these questionnaires are finished we're going to process the information and give it back to you very quickly after the break.

I'm going to do four things this afternoon. One of them has already been done. We're going to make a forecast about some technology and about some important demographic variables on P.E.I. Secondly, I'm going to talk about what demographics, or understanding of demographics, means in terms of determining the future of things like work and unions and demand for certain products or certain services and economic change. Thirdly, I'm going to talk about demographics and technology more specifically, and fourth, I'm going to talk about the future of work, the future of occupations.

A lot of comments have been made already and later on, if you're thinking about what you've heard today, you're going to have to make some decisions about how do I advise the people who count on me or what do I do personally if I am personnel director or if I am a business representative or negotiator, or just as an employee or someone who hopes to become an employee. What kind of decisions do I make, what kind of advice do I need to help manage technology in my future?

Ivan mentioned this morning that some technology advances more rapidly than others. This is quite an old chart, as you can see it stops in 1960. One of the interesting things about studying the future, or studying change is to try to anticipate the pace of change. I think that's probably the key question for most of you. We understand that many things are possible. We understand that it's possible to have the telephone bills for Island Tel prepared in Barbados at some little shop employing people very cheaply, and to digitize that information and send it up to a satellite, bring it back down, print the bills locally and get people to pay it. We could do without a lot of clerical people and a number of other people. Many things are feasible. Many things are possible technologically but we choose not to do it. This chart talks about the pace of time, the lenght of time, it takes from a discovery occurring to the time it becomes commercially viable, or acceptable or in common use.

The idea of photography, the idea of somehow taking reflected light and holding it on a piece of paper of some sort really dates from the early 1700's. Now there were no Kodak instamatic cameras and the rest until hundreds of years later. This chart shows the kind of time frame that took from the beginning of an understanding of photography as a scientific thing, to the commercialization of photography, to the idea of walking into a store and buying film and the rest. Well over a hundred years before photography became something useful that people could have done, not necessarily themselves but could get a photograph of themselves or their family and sent it to somebody else or put it on the shelf. The telephone, the idea of the telephone, took more than 50 years to get from discovery to the market or into the home in common usage. Alexander Graham Bell of course finished that work, made the telephone a commercial kind of product, but the idea of sending some sort of message or tone or sound beyond the length of human capacity to shout, that whold idea happened in the early 1800's. It was another 50 years before Bell came along.

The rest of the chart shows you other kinds of inventions, innovations, and the pace of change. What is worrying so many people now is that it seems that technology is just rushing over us, that every other moment we are told that our skills are obsolete. Products we have in our home are now technologically no good, that we are backward if we don't have this, we feel awkward at not having at our access all the technology that the market place can provide. Part of that concern I think comes our of a chart like this which is to say that the speed, the rate, the take-up of technology is much faster these days. Rather than waiting 100 years between the idea of photography to cameras, inventions now take five or six years, even less. Video cassette recorders is a good example because many of you have them. You couldn't even find one or buy it for any price five or six years ago, and now video cassette recorders are in approximately one third of Canadian households. Much faster than television. It took about 20 years for television to move from one set and one idea on a small black and white circular screen to every household having at least one television set and many households having more than one.

What I'm going to focus on this afternoon is some way of deciding how quickly technology is going to impact my job, my industry, my employees, my union members, my province. The reason I asked you to forecast the fertility rate, and I'll show you the implications of what your own forecasts are a little later, is that in demographics you are looking at fertility in most cases as bing the driving force behind social and political and economical change. Now I'm not here to tell you that's the only thing that matters. I was asked to come in here to explain a tool that I found useful, I'm not here to sell you demographics to look at technology on P.E.I. only. I think, as I'll say many times this afternoon, you need many forecasting tools, many ways of taking a look at change and I know that forecasting maybe as an organized process isn't something that you always do in your company or your union, but I think you do it intuitively and frequently. When you go to bargain for example, you have an idea of how much you can afford to offer, how much you can afford to pay, what benefits are likely to be asked for. An employer goes to the bargaining table having made some forecasting, maybe not in a specific dollar kind of amount, but a feeling that, well, I think they'll take this. The union on the other hand has its own expectations, which are nothing but forecasts, the idea of well, if we sign a three year contract we're going to need this because we think inflation is going to be stable so therefore we can put a little more activity, a little more pressure into some other benefits because we aren't all that worried about losing the value of our dollars. Everybody in this room at some time forecasts in a fairly regular way. The difficulty is, are you forecasting as well as you possibly can? Do you need more help on that? Do you need to sharpen your ability to forecast because the pace of change is rapidly accelerating and consequently you need to be able to anticipate more than three or four years out, or do do a sharper job in your negotiating or in your kind of research for things that your are in a government job and politicians are asking you, look what should we do about this? We don't want to look silly, we don't want to build a causeway that no one's going to use. When do we need the causeway or the tunnel?

This chart shows a concept that demographers use called the total fertility rate. It's the number of children born per woman. It will be clear in a moment why it's a useful forecasting tool. Back in the 1920's it was typical to have big families. Many of you who are over 40 or 50 have a number of brothers and sisters. You came from big families. Big families were typical of agricultural economies. In part, a lot of children were an asset on a farm because we needed more hands and more bodies and more arms to lift and help and plant and harvest and all the rest of that. But then the fertility rate dropped. One reason it dropped was in the depression a number of adults said, "We cant afford a lot of children right now because we don't know how long this depression is going to bite, and we don't know if we're going to have jobs, so maybe we should control the number of children we have." Obviously the reasons were more comples than that, but the chart indicates that in Canada there was a decline in the fertility rate to something like 2.5 children per woman where historically it had been much more.

If we go back in time, even before we have accurate data we can surmise, by reading the diaries of the first pioneers and settlers and arrivals in Canada, a fertility rate that is much higher, something like seven, eight or nine children per woman was typical. In the first place many of those children died very young because we didn't have the kind of medical care we have now but secondly and more importantly, the children were an asset in that kind of an economy. The idea of a big family gave you a lot of people to make your farm more productive. The most interesting point about recent fertility trends is that between 1951 and 1966, in every year we had more than 400,000 babies born in Canada, and we created a concept that John Kettle, who is a colleague of mine, wrote a book about and it speaks about what is quite frequently called the Big Generation. These people born between '51 and '66, they were born in a year in which there were always 400,000 children born. That neverhappened before, and it's never going to happen again. We're pretty sure because the fertility rate is declining, and the population is stabilizing. This big generation bulge that was the baby boom, there were baby booms as well in other countries, but the Canadian baby boom is a unique demographic phenomenon, probably a one-time occurance and it's having enormous implications.

The bridge I have to keep trying to make is what's the implication for technology? I think you'll see pretty soon. It also is an interesting way of thinking about what is the impact of technology on human beings? For example, was the sudden decline of birth rate after 1966, as you see in this chart, the result of technology, like the birth control bill? But the birth control pill really hadn't become commercialized in Canada until about 1966-1967. It was in some cases illegal to buy it. It was just unobtainable for a whole number of reasons and doctors wouldn't prescribe it. So that's not it. It's not a technological phonemonon that suddenly, because we have the pill, we have the means to stop birth mechanically, or chemically. Don't forget the birth rate also declined in the depression in Canada. There was no real technological way to prevent birth at that time. My point about this is that people still have control of technology. You still have a choice, there is not a sense of fate about any kind of technology. Certainly people tend to think that in the work place the technology has got to come in. It's inevitable, it's our fate. We have to have it, we want it as a matter of fact, but there's no absolute technological imperative. I'm not here to be a technological determinist because other people are going to give that point of view.

What demographers do is draw profiles of the population. We usually talk about the population of P.E.I. as about 126,000 people with the population of Canada as about 23,000,000 people. That doesn't tell you enough to do any forecasting though. This chart is the population as it is today, or as it looked in 1981. It hasn't changed all that much. Here is that big generation bulge.

This is split because the number of males is on the left, the number of females is on the right. This shows the numbers of people in generations, or as demographers sometimes call them, in cohorts. There are a couple of things that are interesting about this. The big generation, as they reached adulthood, stopped having babies so they're followed by a little generation. Some things happened to those people when they were growing up in the 50's and 60's that changed their attitudes about what a family should look like, changed their attitudes about what work should look like or who should do the work. Don't forget this was the first generation to experience divorce on a large scale. The divorce reform act came in in the 1960's. All of a sudden hundreds of thousands of marriages split. The sense was that now marriage was an impermanent thing. Surely that's part of the reason that people today say, "Well, maybe I won't get married, maybe if I get married I won't have children, maybe I'll have one child or two children." A sense that we don't want to have the responsibility or the difficulties of a large family in what could be a less permanent institution, like marriage. Marriage is an institution is not dying; the idea of a lifetime marriage is dying. Many people go out and get married again after a divorce. That's another reason, we think, that's holding down the fertility rate.

Also, in very simple terms, the big generation was the first generation to experience television in the home all the time. Television is different from what you'd experienced on P.E.I. before television. Before television most of your experiences were P.E.I. values, after television in the 1950's and 60's this very powerful medium was bringing you values that were largely concocted in New York and Hollywood, and were probably not P.E.I. values. You saw things on T.V. live, animated, often in colour, that we would never think of doing on P.E.I.

I've superimposed on the population pyramid the famous hierarchy by which we run Island Telephone and the International Brotherhood of Electrical Workers, and the Linkletter Convention Centre. It's the way we organize our whole life. No matter how we get together someone is always the chairman, whether it's girl guides or the government, there is a chairman, a boss, a president, a director, a shop steward, we form ourselves into hierarchy. That was O.K. when we had the population to do it. Every business, every organization, government department, union, is based on the idea that we have a couple of small numbers of people at the top who know everything, who are the most experienced, the most brilliant, the most effective, leading large troops of people who are less brilliant, less effective, less experienced, younger, and that's an O.K. operation. That's a good way to run society when you have a perfect opopulation pyramid. Lots of babies, lots of young people, and when they get older, dropping off so that the cream rises to the top. It worked for many years. It doesn't work now.

One of the reasons that it doesn't work now is because of the big generation, they were the first generation to all go to high school. One of the results of going to high school and beyond to consume more and more education is probably a fascination with control, a fascination of what I can do as a person, my own personal achievements, my own worth. That sort of mind set gives you an appetite for technology, gives you an appetite for scientific innovation, for the advancement, for the change that technology supports. You think about it. It's Ian MacKinnon's data ratified, this kind of perception that I'm trying to translate to you. He said the better educated people who are the work force, the more affluent, the higher rank, those in higher social economic status as we say in polling, find technology more appealing. They want it. Give me the terminal on my desk, I have to have a digitized automatic clock car radio combination refrigerator. I want this stuff. These are status symbols. We define ourselves more and more on the basis of the technology that we own, or use or have at our disposal. Consequently, the appeal for a high tech firm.

There again is the population in 1981, in five year age brackets. The pyramid is disappearing but we can still operate on the old rules for a long time. We still need only one president at the university, we still need only one shop steward, we still need only one leader and one premier, but what happens because we can forecast, because these people are here now in P.E.I. and in Canada, what happens in ten or twenty years from now? There is the year 2006. Remember we know who is going to be here in 2006, we know the shape of the population because they're already here. We don't expect that all the 15 year olds on P.E.I. are going to leave, we don't expect that we're going to extend life very much. We think that by the time most people are 90 on P.E.I. they'll be under the Island instead of still on top of it. But something weird has happened. The familiar pyramid has changed. It doesn't fit. Now we've got all kinds of these smart children all raised by television, better educated. They didn't just go to grade eight which was typical in P.E.I. in 1950, they went to grade 12, they went beyond secondary school to community college, to university and all the rest. They now know an awful lot. Trouble is they now think they know more than the people who are running everything, and you're bound to have conflict in the work place about all that, so they ask for continuous learning, they ask for training, they now demand that as a benefit in addition to wages. Every personnel director in P.E.I. and in Canada has been tearing his or her hair out the last few years trying to keep people busy, occupied, entertained, because they now expect from work all the fun and excitement they had in school. That there should be some variety, that they should have some control, that they sould have something new.

Business wasn't operating that way, employers never said to our parents, "We're going to keep you employed, we're also going to keep you learning, keep you active, you're going to have a job of excitement and satisfaction, you're going to be able to reach your own idea of self esteem through your work." Business employers generally said to our parents, "Here's a pay cheque, here's when we expect you to arrive and go home." My father never wanted fun, never wanted to go to a seminar, but now we all go to seminars, conferences, we want continuous learning, we want retraining. We show up at the employers of the world and at the unions of the world and we say, "We don't think we're keeping up folks, we're worried. This machine could take my job, this computer is now doing some things. I've got to be able to use it and adapt it."

Let's go a little farther out though to show you how difficult this problem becomes. This is the population now out to 2031. All those people who were born in the 1950's and 60's, the big generation, are now dying off. But look how they've changed our expectations of what a country should look like. Instead of a few old people and a lot of younger people, through their taxes helping to support them, we now have a few young people relatively speaking, and a lot of older people. So now people are in a panic over in Ottawa about the Canada Pension Plan and other benefit plans because Canada Pension Plan of course is not funded. There isn't a lump of money in the Canada Pension Plan earning investment income and all that, it's pay as you go and it's funded on the basis, like so many other benefit plans, of a few people drawing out at the top who are old, crippled, disabled, retired, and a lot op people on the bottom working and contributing some share of their income to support the older people. It works. It's not going to work in the future under the current rules of the game.

The question for technology to keep bridging that gap between this demographic and this population stuff to technology is, what technology is available? What technology would be available in P.E.I.? What technology do we think of or do we demand that will help us solve this problem? Early retirement seems to be very popular with people but we now have vast numbers of people who will be retiring earlier than ever, living longer, and it's not a few of them, it's a lot of them. The median age is getting older and grayer. Now, do we expect technological advances to make this problem better or worse? What kind of technology would you need to continue to bring up the kind of productivity and income and revenue that we need to support this large bulk, big generation of old people, who are likely to be big consumers of hospital care and health needs and the rest, as we are at this period of time. Is ther a technological breakthrough that will help us at either end?

To bring it more specifically to P.E.I., what's happening right here, the reason people are worried about declining birth rate is because it is happening everywhere. There's the Canadian fertility rate, there's the big generation in Canada when we had more than 3.5, nearly 4, children per woman in their lifetime in the 50's and 60's and it's dropped. One of the reasons the P.E.I. birth rate, the fertility rate, is still higher per woman is because it's more of an agricultural economy as you well know, and the agricultural economy values support larger families. Right now what's happening in Canada and on P.E.I. is that you're not replacing your population and consequently population will level off. It's not going to decline quickly. We're not saying that because all those people who were born in the 50's and 60's will be with us for a long time, but they are not replacing themselves. If you have two people, you have to have at least two children to replace them when they die. They're not doing that, they're having fewer than two children. That's the point of the forecasting exercise.

If you are forecasting a declining fertility rate under the old rules you would have problems because one of the things associated with the high fertility rate in Canada is rapid economic growth and if you remember the 50's and 60's, the good old days as we call them now, they were times of rapid growth. Unions could bargain, not anything, but they could advance their members interests very easily. There was lots of money around, the economy as a whole was growing in real terms at 6% and 7% annually. That's fantastic because it means you double your income in less than your lifetime, it means that almost anything is possible in terms of the things you want to buy or consume. We didn't have a concept of unemployment really in the 1950's. In the 50's unemployment was something like the natural rate of unemployment, about 3%. Those were the people who were changing jobs or they were bored or something. Those were the people who were just starting our. Unemployment as a problem hardly existed. Now we have 10%, 11% or 12% unemployment and we say, "Oh it's structural, we'll never get it down." The MacDonald Commission, after studying the whole thing, found out that what they called the natural rate of unemployment to keep inflation from taking off, is 7%. That's a shocking figure in memory of people in this room who grew up remembering, if not personally working at that time, at least recalling, their dad was never unemployed. That was natural, now unemployment worries them.

The thing about the replacement rates and about the P.E.I. fertility rate declining is it means that you understand now with a great deal of lead time what your needs will be as an island, as a government, as a society in the next 10, 12 or 15 years because most people when they are three, four or five will start going to schools. So you now have a vision of how many classrooms you need for how many people in the year 2000. You now have an idea of how many mouths there will be to feed, what demands will be for transprotation perhaps, because most people do things around a certain group. At a certain age we are in school, at a certain age we go to work for pay, at a certain age we have children, at a certain age we retire, at a certain age we are interested in certain kinds of consumer things. You know, rock 'n roll music is most interesting to people who are teenagers or in their 20's. As a result of demographic change, the gradually aging population, every top 40 station in Canada has had a change of format in the last couple of years because the people to whom that kind of music appeals are shrinking as opposed to the population, they're getting older and you find a few old people, maybe who are 20, running around with mohawk hair cuts in Toronto and things like that but you know they're going to leave that behind, that's what teenagers do. They'll leave behind their bizarre clothing and a lot of their language and they'll also leave behind their music and go on to other things. Radio stations have to be demographically driven.

Why is fertility declining and how can we get it up? We know that technology reduces the fertility rate because we have some ways now of controlling fertility. What's really most important in P.E.I. in terms of holding down fertility is education. If you want to get the fertility rate higher, because we need babies, we need growth, we need mouths to feed, we need something going on in this economy to put our people to work--kick the women out of school. It's that simple. That's the kind of advice you often hear in a sense from conference speakers who say all we have to do is... What this chart shows is that the more education a woman has the less likely she is to have children, and the fewer children she will have. We do know that women are enrolling at even greater rates in our post-secondary institutions and at this moment there is a larger proportion of women aged 18 to 21 in post-secondary education than men. Women have really decided to act like men in the way men traditionally did. Men went to school, went to school longer, got better jobs, stayed in the work force, didn't stay home to raise children and all the rest of it. Women are now saying, "Ah, I like that too. What's the point of going to university if you're not going to use those tools and skills and that training that you have on the market place?" That's the only thing we have thought to do with education yet. We may find other things to do with it in the years to come but at the moment we feel awkward saying, "Isn't that terrible, she has an M.A., and she's driving a cab." Well, it's not terrible if that's what the person want to do, but we have a sense that education, higher education, is for higher jobs and higher learning and advancement and career, and as you do that you reduce the fertility rate. As a result of women having fewer children and having more education they are more likely to work outside the home for pay. Participation rates for women in the labour force, that is those adult women 15 and over who are working or looking for paid work, in 1975 reached about 70% for those who were in their twenties and then dropped off rapidly, because many people who now run corporations and the like expected, "She'll work for awhile and then she will get married and raise children and leave us, so there's no point in training her, she's not going to be here, right?" Well, those rules changed. In 1983 right across the board at every age level the participation rate of women rose and is staying high, to levels of almost 80% of women who are twenty and twenty-five years old. Right across their lifetime, except for very old women who have very traditional values, right across the board they are going to work for the paid work force and they are getting jobs and they are keeping jobs, so you have demands for daycare.

A couple of years ago politicians didn't take all this seriously because they said, "Oh well, women will eventually get tired of this work and they'll go home and have children. They're doing both; they're having children and they still want to work, like men. One of the results of spending so much money on training and schooling from the demographic view is economic change. That's a little simplistic, but I'll show you what I mean. These are the shares of the gross domestic product, that is all the money that we spend and earn and consume in Canada. This is not off-shore profits, this is what happens inside our borders. We have very good data back to the beginning of the century about all this and we see the agricultural part of the whole economy is shrinking. The industrial part of the economy also peaked about 1953, that was the year where industry's share of the economy reachied its highest level in Canada and we have been deindustrializing ever since. What that means of course is that more people are working in other things. Fewer people work on farms, fewer people work in industry. Industry here is defined as the production of goods, it's the making of things that are tangible, things you can put in a box and have weighed. Agriculture is obvious, so though in this case we mean agriculture in primary sectors which also includes fishing and trapping and cutting wood, but in the main it's agriculture.

The growing part of the economy, really the place where all the growth has been for 30 years, has been in services. Services like health, education, retailing, selling insurance, banking. These of course are also jobs of particular appeal traditionally to women. They do these kinds of jobs, it's the things that were available. When women first began to work in very serious numbers in Canada, in the 50's where you had participation growing from 25% and 30% now to 55% of all adult women working outside the home. The jobs that were available to women were not in heavy industry. The factories didn't want them, women maybe didn't want them, they didn't feel that that was training that they had, it wasn't a conducive environment for them, overt discrimination--you could not legally in many provinces work in a mine as a woman. There was a low that said this was only for men, so women had to work in services. It's not a trivial part of the economy, this chart breaks it a little differently, breaks down goods and services, but it breaks services into information services and non-information services.

Information service of course is something like communicaitons, the media, government, where all that's passed is information. Collecting of taxes is only the manipulation of symbols, you don't physically go out and say, "Give me four cows, that is your tax bill this year." Nothing is really traded. The transaction is all symbolic. The non-information services are the others like transportation, utilities, health, food and accommodation, restaurants, dry cleaning, all that stuff. Within the growing service economy, the fastest growing part of the service economy is the information economy and those are the jobs that are demanding a lot of technology. You could not run Island Tel under the old rules because the demand for telephone calls and service was growing so quickly that Island Tel would have to hire not just all the women on P.E.I. now to be operators, but most of the men. They's have to start bringing women in from off-shore, so technology was driven by the demand for that service. Once again you're dealing with a very smart population, as I mentioned earlier, well trained, they are consumers of technology, they are consumers of information and education, probably for the rest of their lives.

Because it's so important, I had the agriculture share in Canada drafted for you. Going back some 60 years we were primarily an agricultural economy and we have changed. Now agriculture's share of the economy is only 4% to 5% in Canada. Of course it's higher in P.E.I. But what happened was we transferred those farm workers. 50% of all the people who were engaged in farming directly on the land in the early part of the century were transferred to the industrial economy. We took them off the farms, put them into the factories and the smelters and the mines. Now, and since 1953, we have been taking more and more workers out of the industry, out of the factories and mines and putting them into services. Of course it's not the exact same worker. We're not retraining many smelter workers to be nurses. The concept of having two or three vocations or careers in a life time, we've never had that in Canada. What Does it look like? What do you do with your pension plan when most pension plans are still not portable from employer to employer? It's a tough challenge, and it's tougher even

even to think about it because we haven't seen it, we haven't done it. There was this previous transition out of agriculture and industry, also some evidence of a transition from industry to services. The difficulty now is we don't see the next fourth step. If you collapse industry can services pick up all the slack, all the excess work , and also can it support the kind of life style and the kind of economy we expect?

In case you doubt it's happening here, yes, it is happening here. These are the shares of employment by sector. It's not the usual way you see it, you usually see people listed in terms of their occupation, but this is where they work, the industry, the sector of the economy they work in. In P.E.I. once again the growing shares for years and years is services, declining shares in agriculture, a fairly steady share in industry. There's not much industry, production of things or plants or factories on P.E.I., never has been, probably never will be. The interesting thing is that vast decline in agriculture, even in a province which is primarily known, whose reputation is as an agricultural province, you are not an agricultural province, you are predominently a service economy. One of the big parts of a service economy of course is government, because so many of the services we demand, like education, like welfare and health and the rest, only government can do well, only government knows how to do, or only government should do.

That's one of the reasons you have to take with a grain of salt the idea of politicians suddenly saying, "We're going to shrink our stake, the government is too big." All of the demands that we can see in the future is for things traditionally only government has done--take care of the elderly, train people, daycare. There is a choice. First place we're going to get into daycare, secondly, that would be the impact of daycare. If you really had free universal daycare, which is a goal of the labour movement and others, what would happen to the fertility rate? It would perhaps zoom. If we had a place to put all these children we might solve the population problem, the pyramid might come back to a real pyramid shape again. Or perhaps if you had free universal daycare the fertility rate would drop some more because then every woman who wanted to work outside the home could. She and the father as well would no longer feel in any sense trapped in where to put their children.

One of the things that the women's movement mentions about the necessity of daycare is many, many women want to work and can't. Many women are working for pay part time and they want full time jobs. A whole bunch of other women can't even consider the idea of work because they have two or three children at home and there's no daycare. Well of course if you do have daycare and you sweep the rest of the women out of the homes you drive up the participation rate already 55% of the adult womem working for pay. Would you bring the rest of them out and why would they have more children only to put them in daycare? Well, which way will that go? The answer to that question dictates some fundamental policy questions. It also has some implications for the technology that we can afford, the technology we bring to bear on these sorts of problems. Is there a technological fix to the daycare problem, for example? One of the things that always turns up in public opinion polling is where people would use technology at home. They don't necessarily want personal computers or electronic garage door openers, they want security items, an idea to look in on the infant sleeping in the crib, the idea to track their children so that they know that they are getting from here to school--probably not a problem on P.E.I., but I want to tell you they're hysterical about it in the big cities on other parts of the continent. Most of the major dairies in Toronto are carrying on the sides of milk cartons the pictures of missing kids. It's terrifying. It ruins your breakfast. Can we not technologically put something in the kid's pocket or their foot or something so that we know where they are and that they're safe?

Back on the question of employment sectors, most people would tend to exaggerate the number of people working in manufacturing, and would tend, especially in P.E.I., to exaggerate the number of people in farming and they will down play the number of people working in services. That was my point earlier about when you're doing the forecast the most important thing is to find out where you stand now. Before I can get to Charlottetown, I have to know where I am in relation to Charlottetown, so before we get to the year 2000, which I asked you to forecast for me, we have to know where we are now. What is your expectation? Do you expect that the farms of P.E.I. will suddenly suck up a whole bunch of workers? Do you expect that you'll be able to win the competition for the Toyota plant and put a lot more people into manufacturing? Do you want to win the competition for the Toyota plant? If you're lucky maybe you'll lose the competition for the Toyota plant! What seems to be growing we know is services. Well, that has some implications for you if you're a union organizer. It means that if you aren't out there trying to organize part timers and trying to organize women and looking at new services and trying to find everything that's going to be around for awhile, you're probably going to lose members. It means that if you are trying to organize in the manufacturing sector of P.E.I. or some place else, it's a small market getting smaller so you're going to have to work a lot harder. Also you're not likely going to be able to keep many of those dues payers for a long time.

The point of the forecast isn't that it's fate, it's not inevitable. All I'm trying to say, and all you're going to be saying when I see what you have to forecast, is this is the way we're going. If we don't like it, stop it. How could we stop it? What could we do to change it? What could we do to put 42% of our workers back on farms? Should we do it? It's not destiny. We're just trying to get the trend right so you understand how easy or how difficult it is to do something different about the future so that in the year 2000 you don't have an unpretty picture that you haven't accepted.

I haven't broken this chart down to P.E.I. because I didn't get that kind of level of statistics, but I can show you what's happening in the Atlantic and the rest of Canada. These are the new jobs by sector. It's just a reinforcement of what I just mentioned. On average, every year something like 18,000 new service jobs are created in the Atlantic Provinces of Canada, and about 1,000 new goods producing jobs. Clearly services are where most people are working and where they want to work. It would be no point for many people to go to U.E.P.I. and obtain higher education and go to work in a smelter. Not because smelter work is undignified or beneath us, but people are in a sense rejecting some of that kind of work. They're saying, as Ian MacKinnon noted, "If you can get a machine to do this, take care of me and God bless you!" In terms of the question about whether automation and new technology create jobs or destroy jobs, well of course technology destroys jobs. Why the hell else would you want it? The shareholders aren't going to stand still if the company brings in a whole bunch of robots at a quarter of a million dollars a piece and hires more people. The only reason to bring this stuff in is to destroy jobs so let's be very honest with each other about it. The point is to eliminate work. The struggle is about who benefits from the elimination of that work, or who gets the new jobs that may be created someplace from that work. But all the data indicates we are wiping out the factory jobs, we are wiping out the jobs that involve muscle and brawn and sweat and we are creating the jobs that involve minds and talent and intuition and services and counselling and therapy and all the rest.

One of the reasons you want to be in services, or utilities, or non-goods production like Island Tel is because you can get a better price. We made a price index, went back to 1971 and put everything at 100 for the sake of the index to see which went up faster. The prices of goods in Canada nearly doubled, the prices of services nearly tripled. An important message if you're investing or negotiating. I mean I have a sense from my familiarity with unions that the service unions are leaving a lot of money on the table. These services are profitable, they're making good bucks and that's why lots of companies want to get into it. General Electric is known primarily as a manufacturer of things, refrigerators, light bulbs, transformers, heavy industrial equipment, locomotives. Well, General Electric's most profitable single division didn't even exist three or four years ago. It is computer leasing. They buy computers and they lease them out. That's totally a service, they don't make the computers, they lease them, they rent them. General Motors, a very clever company that does clever things, started General Motors Acceptance Corporation, which is a bank, a bank for People who buy G.M. cars which enables G.M. to survive in tough times because they can offer cheap financing, 9.7% when the bank rate is 11% or 12% on a consumer loan. A service within a goods production facility.

Another thing you want to think about in demographics and technology is what technology is going to come along that will extend life span. Whay are you interested in that? Because what are you going to do with retirement? Are you retiring people too early? What's happening to our pension plans if we have to pension people off at 60 and they live to be 100? What we do in future research alot is scenarios, say what if, run the computer model on a thing and say "O.K., what happens?" This chart shows life expectancy at birth and how it would change. Right now men live to about 70, women a little longer on average. That's the zero point in the future if we don't change life expectancy. Let's suppose we have a pill that counteracts the effects of aging. You know, take three of these every morning and you'll live to be 75. If we extend life expectancy only a little, by 1%, that's not much change, but you find quite dramatic increases in how old people are and how long they live. As you can see by the chart, if you could imporve life expectancy by 2% or 3% everybody could expect to live to be 100. They could live as old as trees. Now that's not going to happen you say.

but why isn't it going to happen? All of our life styles are changing. People are giving up on smoking or they're smoking less. They're giving up on liquor or they're giving up brown liquor for white liquor. Everyone is jogging. It used to be a rare experience, now it's crowded out there. Everyone's in a health club. We now negotiate with the employer for fitness breaks. Everyone is eating vegetables. Everyone is eating fruit five times a day, bran, we're all deathly afraid of cancer. Well, all that must mean something at the end. It's no good if we still end up dying at 65--what a cheat. Let us at least get to 95 or something. Union negotiators and companies that have a progressive outlook think that we could retire people at 60. Well if they live to be 100, what do you do with people for 40 years? They will get very militant.

Here's the scenario of the population pyramid which I hope now makes some sense to you on P.E.I. My colleague, John Kettle, was retained by Island Telephone a few months ago to write something for their annual report and this chart comes out of it. Once again the three years, 1960, 1985 and 2010 under our population model which is in the computer which says, "O.K. we know what immigration has been historically, we know what death rates have been, we know what birth rates are now, and we're guessing at a low fertility rate, something less than replacement." The population of P.E.I. will still grow a little bit because of all those big generation people and a little bit because of immigration from other places, but it will probably end up in the year 2010 at about 143,000. Not a seriously aged population, more a middle aged population, but you see you're running out of younger workers to support those older workers when they retire so you may want to do something about it. You may want to try to increase the fertility rate. You could offer money, you could bribe women to have children. They do it in the Soviet Union, they're doing it right now in Hungary, they're very worried about this. Or maybe there's a technological solution to the thing. Maybe we don't have to grcw children in mothers. Well that would take a long time to reach P.E.I. Toronto, soon! This is high growth. Let's suppose you can give women an incentive to have more children, but suppose P.E.I. becomes the first province to go into universal 24 hour daycare and it has what may be the effect of raising the number of children, because now having children is easy, it's cheap, we can have as many as we want and someone else takes care of them. That's how I would have more children. Well, you end up with about 157,000 people so that looks a little better because you're retraining more the shape of the pyramid. If you could encourage more rapid growth in your population you'd solve some of your problems under the traditional rules. You'd also have more jobs.

I want to finish up by talking about education because education is a driving force along with demographics in this appeal for technology. To manage the information we want more television service, more opportunities, more cable stations, we want more communication, we want to be able to access data from data banks on line through our T.V. sets and all the rest. This is a chart that is a picture of what has happened in education. See if it rings true in P.E.I. In the early 50's the average education was about 8th grade, then we went off to work, or went off to families or helped on the farm. In the 80's grade 12 was typical. On trend, we expect in the 21st century, typically, not everyone but typically, people will have about three years of post-secondary education. Already one third of the work force has some post-secondary education. A phenomenal change as I mentioned earlier. People who started in employment situations in the 1950's and 60's thought that by the time they got to the top they'd still be bossing a lot of fairly untrained passive people. Now they finally got to the top, finally made it to Deputy Minister or union leader or general manager, and everyone below me is smart! Well that's no fun, they give me nothing but grief.

The labour force participation in the 50's is about 55% of adults, in the early 80's it's 65% of adults, mostly women. The participation rate for men still hasn't changed, it's still 78%, 79%, 80% of adult men out there working or looking for work. On trend, that will go to 70%. You have to start asking if there is a limit to the number of people we can employ. What's magic about 55%, 65%, 70%, or suppose it's 80%? How would we have enough jobs if 80% of all the adults want to work for pay? Well, job sharing, early retirement, part time work, longer holidays, is there some fast tool for economic growth? If you know, you'd better come up here and take the microphone and tell us what it is.

One thing you have to think about of course is with the increasing participation rate of women, what do you say when a politician says for example, "We're going to create jobs and stimulate employment." What he or she is saying is that we're going to create female jobs, we're going to stimulate female employment because women are getting three out of four of all the new jobs created in Canada. So we are increasing the kind of feminization of the work force. That's a big message for some employers, a big message for some union leaders too. They sort of think they'll be able to operate under the rules where, you know, the woman is an exceptional person in the work place, or exceptional in the union hall, or exceptional in society. Population doesn't change very much of course. You saw earlier, we know the folks that are going to be here. We know that people are not having as many children, we know some of the reasons why. We don't expect it will open the doors to immigration because which province will take them? Will P.E.I. take them? The difficulty with immigration is that the immigrants all look like us in terms of population. We can't just import the children. We might try but the other nations would get a little testy. They say, "If you're going to take our kids, you're going to take our adults." Well when do people immigrate? They immigrate when they're 20 and 30 years old. They immigrate at the same age where we have all these unemployed people, so if you don't want them fighting at the dockside, you don't invite immigrants.

But the population's going to flatten off. Early 21st century in Canada we see something like 25,000,000 people, maybe 140,000 to 160,000 in P.E.I. The labout force is growing because of population and one of the problems with unemployment is that we have many more people who want to work, also many more people who are available for work in a larger number of people. What the politicians say as a cop-out is "structural unemployment." In other words you shouldn't have been born. Why were you born if we haven't got a job for you? But we're spending more time educating them.

That's one of the ways you solve the problem of high unemployment. Don't let them into the personnel office yet. Make it more attractive for them to stay in school. In Ontario, which as you know is a leading province in many ways, we're now paying people to go to school. Well, it doesn't really sound like that but they identified 56,000 hard core young unemployed people, teenagers, and we've said to them in the last new budget from the new liberal government in Ontario, "We'll guarantee you a job at the minimum wage, $4.00 an hour, but you've got to go back to school and finish high school equivalency." Paying them to go to school...isn't that socialism? No, because the N.D.P. attacked it. So now we're comfortable with it, now we can do it, if it was socialism why was the N.D.P. upset? Well, if we're now paying them in Ontario to go to school, pretty soon it will come here.

The median age of adults, this is important because we have to understand who is available to work and who is available to manage and who is available to pay the bills for all this extra education everybody wants, the median is of course the mid-point. Half the people are 37 or older or younger, that hasn't changed much. In the 21st century we'll get somewhat older. We aren't going to become an old crippled population over night. It will take some time so we have time to get used to it, unless we find some technological change coming along which improves and extends life very quickly. Who knows if that's going to happen? But the average work week is declining. This is a statistic that's not like what you're normally going to see reported in conferences like this. The average work week in Canada hasn't changed very much, 37 or 38 hours. This is the work week divided by all the people who were available to work, so it includes the people who are unemployed. That's our definition of the average work week, you see how it's declining, but it also includes those people who are on strike, so it means everybody on the labour force; working, not paid, striking, everything else, by the hours that actually were worked. We have an average work week now of 30 hours, on trend it will decline to something like 25 hours and all the pressure is there as you know. The unions are negotiating for shorter hours, people say we'll give up some time, we'll work share, people like retiring earlier, unemployment is likely under most forecasts to stay high, so we shorten the work week. This chart shows the person-hours worked per year, in other words the actual hours worked. It will still grow. The difficulty is from the 21st century that 23 billion hours work is probably not enough for all the people who want to work, under the current rules where most jobs are still full time, but 14% to 16% are part time.

The point of going through this exercise is we made an index for education, that in the 50's was 100. People went to school for about eight years, they worked for most of their lives, they didn't retire very much, they had a 40 hour week. The education index has now doubled and that means behind every hour worked we now have twice as much education at this time, because we're going to school longer, because hours of work are declining. In the early 21st century it looks like people will go to school even longer, more people will want to work, less work might be available under the current rules. Technology is going to take away jobs we anticipate. We will have an education intensity of 300 on this kind of rough scale. It means that we have to put three times the education power behind an hour of work. That's a very difficult problem

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This is a chart showing the amount of time we have in a week. We have a lot of leisure, but of course a lot of it isn't very useful leisure because some of it is spent commuting to and from work, especially in bigger cities. But this chart indicates that part time work is having its effect in early retirement, longer holidays, unemployment, and they are all contributing to leisure, that's been the growth from the 50's to the 80's. Work hasn't changed that much. We still have around half a billion hours of work and about a billion hours of leisure a week. That's why if you're looking at new products to invest in or companies to set up or things to do with and island for an economy, look at leisure. That's what's growing. Work is not. But what happens in the future? It's fairly simple to extrapolate these trends. Almost all the gorwth in human activity in the next 15 years will be in free time, on paid time, under the current rules unless we find some way to instantly employ a lot of people, unless a lot of people say, "No, I don't want to retire, I want to work until I drop." Unless people say they don't like vacations, they want to work 52 hours for 52 weeks a year. None of those things is likely to happen perhaps, but you are making the forecast about all this.

The trouble for the public sector unions here of course is all these folks who are very smart, running around with all that spare time. So what do they do after they've watched all the television, been to all the libraries, played all the tennis and raquetball they can? They go volunteer in the public sector. In toronto right now, probably in Ottawa, the first floor of most hospitals is now done by unpaid work. The first floor is the unprofessional floor, it's got the gift store, it's got the patient inquiry, and it's got where you'll find the room number for your mother if she's sick, and it's got a lot of other kind of helpful sort of things for people. The first floor of most hospitals in Toronto is now totally unpaid. Well they've stopped it there, but maybe they can get to the second floor. In the schools they've already gotten to the second floor--you have reading mothers perhaps in P.E.I., they have them in other parts of Canada, volunteers to help out in the play ground, and with our preoccupation for the health and quality of the upbringing our children have and our great fear about protection of children, I expect more and more volunteers will be recruited. They are gobbling away at what was paid work in the public sector because we have this sort of industrial view that public sector work isn't real work. The real work is out there on the farms, in the mines, in the smelters getting dirty and sweaty and getting killed--that's work. But hospital and garbage collection, we have these kind of views that as an economy, as a society we tend to devalue public sector work and public sector unions will have some difficulty about this.

One kind of way of forecasting technology that brings together in a very intimate way this question of demographics, is when you try to do educational forecasting. John Kettle and I finished a report for a construction union last year. They wanted to know about apprenticeship. They were very concerned about apprenticeship, they wanted to tranin their members and train their future members and they wanted to know what to train them for. A logical question. We made a computer model of hours worked in construction. What the computer does is it invents a time machine. There's the actual hours worked in construction in the last 10 or so years. We then said O.K. we have to guess at the major changes involving construction activity with a result of economic changes because in economic change is how we spend our money. We're spending more on services, less on goods. We're spending more on the public sector, less on the private sector. These changes are affecting all jobs and let's see if that thesis works. If we only explained the variations in construction employment and hours worked by economic change in the whole economy, well what would happen? Pretty good model. The model fits. Now we haven't got a lot of data here. We would have liked to go back farther to test it some more but we have a model that seems to work. So we then have a model and we can get in the time machine, having gone backwards to find out if we predicted well. If we had this model in 1976 would it have gotten the hours right in 1982? As you see in the chart it did. Almost right on. Now we can go ahead from 1982 and see about the future. But we've stretched it out to the 21st century and we found out that with high growth, faster economic gorwth ghtn we have now, something like 4% or 5% real economic gorwth, hours worked in construction still declined. With slow growth of course they declined even more. What it means is construction work, if you people in this room have anything to do with the construction and building trades, the construction industry is, as they say in business, a mature market. Any job there is going to be a replacement. There's no growth under the current rules. Part of the reason of course is economic change, we saw that in the model, part of the reason for economic change is demographic change. A flat population doesn't need as many new homes built, we don't need as many schools built. Even in a basic industry like construction where you sort of think people will always need housing and revovation and all the rest, the forecast would indicate no growth.

On the other hand we can talk about some things that may change in construction. One of them of course is you'd have fewer homes, fewer commercial properties. With a flat population and low growth you don't need a lot of new shopping centers. What would you possibly build? We did a regression. We took the model and applied it towards the new institutional and government permit. These are things like highways, prisons, government office buildings and that sort of thing. We found out that with a low growth forecast, when economic growth was weak, the construction industry for that part of construction did better. True, they were not building homes, true, they were not building factories. We have no need to build another factory in Canada probably ever again under the forecast. We're not spending much money in that area, but one of the reasons obviously is if you have a recession, if you have slow growth, and you have continuing high unemployment, people will come out of their homes and they'll march to Charlottetown and they'll say to the government, "Build something, you've got the money. No one else has any money. Build the causeway. Open the tunnel. Give us something to give our people some work." It's part of a piece of the puzzle in terms of anticipating technological change and advancement and the economy of the future of Prince Edward Island. What are your expectations about the future? On the computer model, institutional and government building picks up.

That's what I want to say about the impacts of demographic change on technological change. The future in many ways is obviously in your hands. The point of the forecast, as I mentioned when I began, is not to get it right on the button and know what the temperature is going to be tomorrow, but to be able to know when things are getting warmer or colder, to have some sense of direction and if we don't like the direction it's going in we've still got 10, 15, or 20 years to change course.

I've tried to explain four things: that you can forecast yourself, that you do forecast all the time, that demographics is certainly a big part of determining the technology of the future and how quickly that technology comes into play, and what its impact would be ant that technology is a very important part of the entire economy, which surely has some meaning for the advancement or the retardation of the new technologies that you're studying. I'm going to be speaking later for 30 seconds when we have the results of the little surveys that you did so you'll be able to take away at the end of the day your forecast, and be able to tell yourself and others when you think the causeway will be completed and what you think the fertility rate is going to be and what you think the outcome of the economy is going to be in the year 2000 in those big employment sectors, which should give you a clue to the kind of training strategies, bargaining strategies, economic strategies and policies that you support or try to oppose.

Nancy Riche:

I'm here representing the national union of provincial government employees and some of you may not know about us, but if you know P.E.I. U.P.S.C., the public sector union in this province, you will know about NUPGE because that's our component and I understand that there's about 30 members of that union her today. I also should tell you that part time, about one week out of every month, I work for I.B.M. in the area of high tech.

Now I want to first of all commend the Labour-Management Relations Council for having this kind of day, because I think probably the only province in Canada has seen technological change as a concern for both sides. We in the labour movement have been for a number of years talking about our concerns, our fears, our absolute terror about what's going to happen about the elimination of jobs, about deskilling of jobs when people into positions of data entry that require somebody sitting at a terminal hour after hour after hour. In fact, we have a film in our union that we've done that shows the women with earphones on their ears while they're working on the terminals. The earphones are radios. They're listening to the news or music programs or whatever they want to listen to because the job they're doing does not require them to think. We have those kinds of concerns and we know that those kinds of things are going to happen. We have been saying for a number of years that we have to do something about it. I think what we can do is exactly what you're doing. I think we should look at technological change like we've looked at occupational health and safety. All across this country we have labour/management committees dealing with occupational health and safety in a cooperative approach as opposed to an adversary approach and it's working because both sides are concerned. We've heard from management and labour today both saying their concerns. Unions need to be more involved in this kind of session. I was absolutely fascinated listening to Mark Zwelling and thinking to myself, we should be doing more of that, because now I know why they added an extra year to the education program in Newfoundland. They have an extra year of high school because they looked at the demographics and they made the decision that keeps a bunch of people off the U.I. lines in Newfoundland. If they kept them on, it would be about 50% unemployment. I'm from Newfoundland, by the way. I only live in Ottawa, don't ever let anyone tell you I'm from there! So they've looked at the demographics for Newfoundland and they made those decisions so it means that unions have to get a little more sophisticated too. We have to do these polls and we're beginning to, and finding the kind of things Zwelling has talked about. You do know that the C.L.C. last year added six extra seats for women because the women in the labour movement were not represented at the high levels, the decision making levels of the labour movement. Now none of 'the boys', none of them would step aside, so in order to get the women there we had to add six extra seats. So listening to Marc Zwelling I figure in 1992 they'll add six extra seats for people over 68.

Well, we have been collective bargaining about tech change. Since I was coming to P.E.I. I had a look at some of the collective agreements in P.E.I. and in fact we looked at 11 agreements and looking at the kinds of things that labour is saying we should be doing for tech change and what has been happening, where we're going in the year 2000. We need to know where we are right now, obviously. Do you know that out of all those 11 agreements not one defines technological change? Not one. So even though there are different articles saying different things, nobody obviously knows what they're talking about, because neither side are together. When the union went to ask for a definition they didn't get one. We looked at the U.P.S.C. in the provincial government, U.P.S.C. in Holland College teachers have the best. That fits in with what MacKinnon said this morning about the class system and the more educated and those who are happy. It, interestingly enough, fits in with what Blake said this morning about the people who are higher educated being happier, and also the people who are more articulate being able to speak on their own behalf, being able to say what they want, which means to say if you know anybody out there who's unorganized they obviously need a union to help them prepare for what's coming in the year 2000.

In the area of advance notices, which is one of the concerns of the labour movement, I think three of our eleven agreements mention advance notice and it ranges from, and I love this, "prior to implementation"--that's the advance notice you'd get if you work for the grain elevator corporation here on P.E.I.--so that Friday afternoon, "We,re implementing something Monday morning you guys," and they're covered under the collective agreement. Mind you if you work at treatment centers, you don't get any advance notice. If you're with P.S.A.C. here you get three months advance notice for some agreements, 45 days for others. But advance notice is nothing. It really isn't anything to be able to say to somebody even a year ahead, and we've found in most of the legislation, the provinces that have legislation, we talk about 90 days, then we talked about six months, and now we're talking about a year, but so what? I mean what is the point of saying to a bunch of workers, "A year from now a whole bunch of you are not going to have a job." I think advance notice must be talked about in connection with consultation. We're not suggesting and we're not naive enough to say that consulting means that things are not going to change. We know it means the elimination of jobs, so part of the advance notice is the consultation, is the retraining. Do you know there's a collective agreement in Newfoundland with Health Care Workers that says there will be no layoffs for tech change? You know they negotiated this 10 years ago when nobody knew what tech change was. Certainly they didn't know what they were talking about so they guaranteed no layoffs, so now they layoff for something else. It really doesn't mean anything. But they do have in that agreement retraining, fully paid for by the employer.

In P.E.I. what do we have in retraining? With the provincial government collective master agreement, absolutely nothing. Holland College teachers, if required, will be provided at no cost to the employee, but read on. It's the employer who decides if it's required. In some places you have consultation with the affected employees, but nobody else knows what's going on. It's a treatment center if the employer requires. Grain Elevators has no provision whatsoever for retraining. This is not to say that they're not doing this. I'm not suggesting this is not happening, but I know it's not in the collective agreement so if I were a worker there I wouldn't feel that I had that kind of protection because it's not in my collective agreement. CUPE and P.E.I. General Hospitals, again if the employer requires employees to train, training will be provided, but there's not consultation, there's no advance notice and there's no opportunity for the employee or the worker to be involved in the process, and therefore obviously it's going to be up to the employer.

We've looked at all sorts of sections, transfer layoffs, recall rights, when you get the handout you will notice that most of this stuff is blank which is to say that there's not a lot of negotiations going on around the area of technological change in P.E.I. Now, that could be a problem because I feel P.E.I. is much like Newfoundland and I think we could be far enough behind to be ahead, which is saying it much like a Newfoundlander would. I think we might be able to get ahead of the game if we start looking at what's going on on the west coast, what's happening in Ontario, God forbid we ever look to Ontario for anything, but we should look at that and then know wheere we want to go. Since this is a labour-management relations conference, I am assuming that both sides are interested in doing the right thing for tech change. It hasn't always been that way.

In some press clippings from the Guardian, October 15, there was a great article about new technology in the lobster plants and the farming of lobster and being able to catch lobster when they're very tiny and then when they grow and everybody wants them you can take them out of the farm and sell them, so that all these bigh P.E.I. lobster suppers that attract the tourists won't have the people eating lobster from Maine and New Brunswick, it says so right in the article, and you get all the lobster you want. They're going to have meetings around the province to tell all the fishermen about it. Well, the next night there's an article about the meetings they had with the fishermen and the headline says, "Fishermen Charge That Meetings Are an Insult." The reason they charged that the meetings were an insult was since fishermen have no input into the new Victoria Plant, they were not very pleased. Fishermen were quoted as saying, "It's already decided, so what the hell can we do?" and that goes back to advance notice, to consultation. Had these people all been involved and participated in the process then it would have been a completely different story. So we can't succeed without everybody, all the players, being part of the process. But it's very difficult on P.E.I., the Labour Act says nothing about tech change, the Civil Service Act here on P.E.I. states that negotiations should take place only on items identified on the Civil Service Act Regulations, and the regulations identify the following items as subjects for negotiations.

This is what you call collective bargaining; the employer tells you what you can talk about. You can talk about rates of renumeration, hours of work, overtime and other premiums, paid holidays, vacation, life insurance, leave of absence except for political activities or training, other matters untually agreed upon. Nowhere does it say that both sides negotiating under the Civil Service Act can even talk about technological change. But they can if both sides mutually agree and in fact they do have a joint committee, but they can only talk if both sides agree, so if the provincial government said, "Forget it guys, we're not talking about tech change," that was it. No change, no choice, no option. So we have to make some changes there and obviously in the collective bargaining we have to tighten up all those other things. We have to deal with the idea that people are very scared of technological change. That is changing, that's changing from what we heard from speakers today. Five years ago at a tech change conference, you would have heard completely different things.

I still have to ask questions about pollsters who are taking polls. I'm wondering, when the people are answering do they know what they're talking about? I mean I'm not sure if I know when they ask me a question. I want to know when the candidate is polled about how happy people were working, was there any consideration given to all the people who were not? People are happy if they have a job almost these days. There's a whole lot of people out there. Every time you go up to the self-serve gas station, I would hope..., I haven't gone to one yet, I'm toing my own Luddite thing right? I just won't go, and I think that's going to change. Everybody's going to go back to employing people to work in gas stations. But every time you fill up yourself you know it was somebody that had a job doing that awhile ago. I'm not as pure as I look, I do go to instant tellers because the convenience is wonderful. So I'm really screwed up, I don't know what I want, I need that Sunday morning to get my money too. But there is a fear out there about technological change because we don't know a whole lot about it and both sides are going to have to do something about that. We have now, and are beginning to accept the fact that it will mean the elimination of jobs, so we have to look at other things. There's no point in having advance notice and consultation if 20% of the work force is going to go anyway. So we're going to be looking at other things. We're going to be looking at a shorter work day, shorter work week, longer vacations, paid educational leave, no over-time, this is going to be the trend in negotiations because it's just not going to work if we don't do it that way. It's also not going to work if we don't have the political will, and I think it was Blake who said this morning about the choices being made by those in power, to govern is to choose, which means that the people in power are going to have to make decisions about legislation, they're going to have to set the atmosphere for collective bargaining in this province and other provinces. That has to be done.

I just came from the Newfoundland Federation of Labour convention, where they had a public lecture by Reverend Bill Major, and a couple of things he said, he listed his new 10 commandments and I think this must be kept in mind, that the prime purpose of the economy is to meet the needs of the people. Capital and technology need to serve people, and people cannot be slaves to either.

Discussion Group Summaries:

Carol Davis: We talked about the need for legislation to make tech change articles to enable everybody to negotiate on technological change. We also talked about joint consultation and the need for definitions of technological change in all agreements. When we talked about legislation we talked about it for all workers, not just unionized, and we also discussed the education and retraining. The last thing we discussed was the benefits to be shared with the workers, the profits to be used for shorter work weeks and that type of thing.

Stan Chaisson: One of the things we thought should be done as much as possible was that the employer give as much lead time as possible to employees if he knows that he's going to be introducing some new technology and machinery or whatever is going to change drastically the jobs of the employees. The second thing we came up wit, we figured the employee must put some time in on his own in order to keep himself or herself up to date on new changes. It's not totally the responsibility of the employer. Third, consultation between employer and employee on any new training required, again regarding location where this could be available, the cost, etc., as much as possible that can be found out. We think this should be done between the employer and employee on a consultation basis. Fourth, have as much training as possible available to the employee, free of charge, whether that be that he or she can attend a course and still get the day's pay or whatever it happens to be.

Barb Woodrow: We discussed lobbying government for changes in legislation. One thing that hadn't been mentioned, we feel that health and safety legislation should be introduced to protect the employees from the adverse effects of tech change. Something else was, we feel that the education system, tech change should be introduced into the education system, starting from the elementary level and for sure in the secondary level to prepare the people coming out to deal with tech change.

PLEASE INSERT THIS COPY OF MR. FRANCIS REID'S PRESENTATION TO THE 19th L.M.R.C. CONFERENCE AFTER PAGE 105 IN THE ANNUAL CONFERENCE REPORT.

MR. CHAIRMAN, LADIES AND GENTLEMEN; IT IS INDEED A PLEASURE TO BE PRESENT WITH YOU HERE TODAY, AND TO PRESENT TO YOU MY VIEWS ON TECHNOLOGICAL CHANGE AND ITS IMPACT ON P.E.I. TO THE YEAR 2000.

IN THE LAST FEW YEARS WE HAVE CERTAINLY GONE A LONG WAY ON THE ROAD TO CHANGE IN TECHNOLOGY. PERHAPS A GOOD EXAMPLE WOULD BE OUR POTATO INDUSTRY HERE ON PRINCE EDWARD ISLAND. NOT MANY YEARS AGO, MANY OF YOU WILL REMEMBER THAT WE WERE USING THE BEATER DIGGER FOR HARVESTING OUR POTATO CROP. TODAY, WE HAVE GONE TO LARGE COMPUTERIZED HARVESTERS TO HARVEST OUR ABUNDANT CROPS AND THESE CHANGES HAVE ALL COME ABOUT IN THE LAST 30 TO 35 YEARS. WHAT, THEREFORE, WILL THEN HAPPEN IN THE NEXT 15 YEARS?

I FOR ONE COULD NOT BE FOR SURE WHAT WILL BE THE CHANGES IN THE NEXT FEW YEARS. HOWEVER, I WOULD LIKE TO TAKE A MOMENT TO RELATE TO YOU SOME STATISTICS RELATIVE TO PRINCE EDWARD ISLAND AND CANADA AS OF THE PRESENT TIME.

- IN DECEMBER OF 1984, THE CANADIAN WORKING AGE POPULATION AVERAGED 19,148,000. OF THIS TOTAL THE 25 TO 35 AGE GROUP REPRESENTED THE LARGEST GROUP, APPROXIMATELY 22.7%.
IN PRINCE EDWARD ISLAND, IN DECEMBER OF 1984, THE TOTAL OF WORKING AGE POPULATION 93,000 OF WHICH THE 25 TO 34 AGE GROUP WAS THE LARGEST AT 20.4% SOME 2.3% LESS THAN THE NATIONAL AVERAGE.

IN A COMPARISON WHICH I HAVE REVIEWED OF THE NATIONAL AND THE PRINCE EDWARD ISLAND WORKING AGE POPULATION STATISTICS, IT SHOWS THAT THE P.E.I. GROUP IN THE 20 TO 24 AGE GROUP AND THE 35 TO 44 AGE GROUPS HAVE A GREATER PERCENTAGE OF THE TOTAL WORKING AGE POPULATION THAN THE SAME GROUPINGS FOR THE NATIONAL TOTAL AND ALSO THE AGE GROUP FOR P.E.I. FROM AGES 55 TO 64 IS LESSER THAAN THE NATIONAL PERCENTAGES FOR THIS GROUP.

- THE LABOUR FORCE ON PRINCE EDWARD ISLAND IN 1984 WAS 56,000 PEOPLE; AN INCREASE OF 1.8% FROM THE YEAR BEFORE. THE LABOUR FORCE FOR CANADA IN DECEMBER 1984, WAS 12,399.000 OR AN INCREASE OF 1.8% FROM THE YEAR BEFORE.

IN 1984, ON PRINCE EDWARD ISLAND, MALES ACCOUNTED FOR 57% OF THE LABOUR FORCE. THIS WOULD INDICATE THAT PROVINCIALLY WE HAVE A GREATER NUMBER OF THE WORKING AGE POPULATION IN THE YOUNGER AGE BRACKET AND A LESSER NUMBER IN THE OLDER AGE BRACKET THAN THE NATIONAL AVERAGE.

HOWEVER, OUR LABOUR FORCE IS INCREASING AT THE SAME LEVEL AS THE NATIONAL AVERAGE, AND AS WE LOOK FORWARD INTO THE FUTURE, SOME FORECASTERS ARE FORCASTING AN IMPROVEMENT IN LABOUR MARKETS IN CANADA WITH THE UNEMPLOYMENT RATE ON A DOWNTREND AND THE EXPECTED GROWTH OF THE LABOUR FORCE TO BE SLOWER IN THE FUTURE WHICH IS BROUGHT ABOUT BY SEVERAL ELEMENTS SUCH AS:

(1) IMMIGRATION WHICH HAS DECLINED SINCE 1980 AND WHICH HAS FURTHER EXPECTATIONS FOR DECLINE IN FUTURE YEARS

(2) THE WORKING AGE POPULATION ELIGIBLE FOR THE LABOUR FORCE HAS SLOWED DOWN TO A 1% PER ANNUM RATE OF INCREASE WHICH IS EXPECTED TO DECLINE BELOW 1% IN THE NEXT FEW YEARS. ALL OF THESE THINGS ARE HOPED IN SOME AREAS TO BRING THE UNEMPLOYMENT RATE BY THE END OF THE NEXT YEAR TO APPROXIMATELY 9.1%.

CANADA IS A LEADING INDUSTRIAL NATION AND ENJOYS ONE OF THE HIGHEST PER CAPITA INCOMES AND STANDARDS OF LIVING IN THE WORLD. HOWEVER, IN THE NEXT FEW YEARS, MANY OF THE PLANTS AND FACILITIES BUILT SOME 20 OR 30 YEARS AGO WILL BE OUTMODED. IT WILL TAKE A VIGOUROUS RE-GENERATION OF INVESTMENTS IN ADVANCED TECHNOLOGY IF WE ARE TO MAINTAIN OR OBTAIN A COMPETITIVE POSITION.

THE CAPITAL INVESTMENTS OF THE PRESENT DECADE FOR BOTH NEW AND MODERNIZED FACILITIES WILL LARGELY DETERMINE CANADA'S FUTURE PRODUCTIVITY, COMPETITIVENESS, AND GENERAL ECONOMIC STATUS.

TAKEN AS A WHOLE, CANADA IS STILL MAINLY A DEVELOPING NATION, AND IN SOME AREAS SUCH AS OURS THE STIMULUS OF THE OFF-SHORE DEVELOPMENT COULD INDICATE THAT THIS AREA AND PRINCE EDWARD ISLAND IN THE YEARS TO COME COULD BE DESIGNATED A DEVELOPING AREA.

TO PREDICT THE IMPACT OF TECHNOLOGY CHANGES ON PRINCE EDWARD ISLAND TO THE YEAR 2000 IS PARTICULARLY PERILOUS, HOWEVER, SOME OF THE CHANGES THAT WE CAN EXPECT ARE:

1. THE USE OF COMPUTERS AND SATELITTE COMMUNICATIONS WILL IMPACT ON P.E.I. WHEN LARGE FIRMS SUCH AS MULTI-NATIONAL FIRMS ARE ABLE TO BRING THEIR EXPERTISE DIRECTLY FROM THEIR HOME BASE TO P.E.I. AND APPLY IT TO P.E.I. CONDITIONS IN COMPETITION WITH OUR PRESENT FIRMS.

2. THE LINK BETWEEN THE DEVELOPMENT OF ADVANCED PROCESS TECHNOLOGY AND CAPITAL EQUIPMENT MANUFACTURERS WILL BECOME MORE PREVALENT. AS THE COMPUTERIZED OPERATIONS OF PROCESS PLANTS EVOLVES, THE CAPITAL COST OF COMPUTER EQUIPMENT WILL INCREASE RAPIDLY IN IMPORTANCE AS A COMPONENT OF THE TOTAL COST OF A PROJECT.

3. GREATER USE OF COMPUTERS WILL BE SEEN IN THE CONSTRUCTION INDUSTRY WHEN COMPUTER AIDED DESIGN AND MANUFACTURING AND ROBOTICS WILL LEAD TO INCREAS USE AND MERGERS WITH DESIGN ENGINEERS.

SINGLE PRODUCT MANUFACTURES MAY WELL GIVE WAY TO THOSE WITH DIVERSIFIED PRODUCT LINES.

4. COMPETITION AMONG ALTERNATE MATERIALS, COMPONENTS, AND STURCTURES WILL CONTINUE TO FOSTER RESEARCH AND DEVELOPMENT, HIGH TECHNOLOGY, QUALITY OUTPUT AND GOOD AVAILABILITY.

5. MANY ELEMENTS OF INDUSTRY WILL UNDERGO APPRECIABLE CHANGES IN THE NEXT TWO OR THREE DECADES. NOT THE LEAST OF THIS WILL BE LABOUR WHICH WILL TEND TO INCREASE ITS DIALOGUE AND PARTICIPATION WITH MANAGEMENT FOR THE WELFAFE OF ITS MEMBERSHIP AND FOR THE INDUSTRIES AS A WHOLE. MANY CHANGES WILL EVOLVE IN RULES OF JURISDICTION, ETC. PRODUCTIVITY STANDARDS WILL BE IN EVIDENCE, RATES OF PAY WILL BE MORE RESPONSIVE TO WORK REGIMES AND SKILL AND TRAINING REQUIREMENTS IF ACTIVITIES; TRAINING WILL BE MORE EFFECTIVE AT JOURNEYMEN AND SUPERVISORY LEVELS AND MORE EMPHASIS WILL BE PLACED ON METHODS OF OBTAINING JOB SATISFACTION. IMPROVED PRODUCTIVITY IS A KEY FACTOR IN THE EFFICENCY AND COMPETITIVE EDGE WHICH WILL BE NECESSARY IF WE ARE TO COMPETE IN THE FUTURE.

   PRODUCTIVITY IS DIFFICULT TO DEFINE AND MORE DIFFICULT TO MEASURE, IN THAT PRODUCTIVITY MEANS DIFFERENT THINGS TO DIFFERENT PEOPLE. HOWEVER, ECONOMISTS REGARD IT AS A RATIO BETWEEN THE TOTAL INPUTS OR RESOURCES AND OUTPUT. THESE INPUTS INCLUDE LABOUR, MATERIALS, EQUIPMENT, MANAGEMENT EXPERTISE AND TECHNOLOGICAL IMPROVEMENTS.

6. EDUCATION AND TRAINING WILL BE INCREASED TO ACCOMODATE THE NEEDS OF INDUSTRY IN THE FUTURE. IT MUST BE REMEMBERED THAT THERE HAVE BEEN SERIOUS SHORTAGES OF SKILLED LABOUR IN THE PAST AND UNDOUBTLY THERE WILL BE SHORTAGES OF CERTAIN SKILLS IN THE FUTURE. CONSIDERATION MUST BE GIVEN TO THE TRAINING OF THESE PEOPLE AND TO THE LEVELS OF QUALIFICATION THEY RECEIVE. FINALLY, IT HAS BEEN SAID THAT THE WHOLE FIELD OF MICRO-PROCESSING AND INDEED THE NEW ERA OF INFORMATION TECHNOLOGY IS EXPECTED TO TRANSFORM OUR SOCIETY. IT IS EVEN CLAIMED BY SOME THAT THIS NEW TECHNOLOGY WILL BRING A GREATER CHANGE THAN THE INDUSTRIAL REVOLUTION. THEREFORE, IT IS ANTICIPATED THAT TECHNOLOGY'S IMPACT ON P.E.I. TO THE YEAR 2,000 MAY BE IN A REALM WHICH WOULD BE VERY DIFFICULT FOR US TO UNDERSTAND AT THIS PRESENT TIME, HOWEVER, WE MUST TAKE WHATEVER ACTIONS ARE NECESSARY TO ACCOMMODATE THIS CHANGE. WE MUST NOT BECOME THE VICTIMS OF CHANGE, BUT WE MUST BECOME THE MASTERS OF CHANGE.

IN CONCLUSION, I WOULD LIKE TO QUOTE RABBI LEWIS N. GINSBURG IN HIS ADDRESS TO THE CAE LUNCHEON IN CALGARY THIS YEAR, AND I QUOTE, "AS LIFE BECOMES CHEAP, MATERIALS THINGS BECOMES PRECIOUS. THAT MAY BE WHY WE SO OFTEN BYPASS THE LASTING THINGS FOR THE LATEST THINGS. WE HAVE CONFUSED RUNNING AFTER PLEASURE WITH THE PURSUIT OF HAPPINESS. WE HAVE ADDED KNOWLEDGE WITHOUT INCREASING WISDOM. WE HAVE OVERSTUFFED OUR BODIES AND STARVED OUR SOULS. WE HAVE BEEN SO CONCERNED WITH MAKING A LIVING, THAT WE HAVE PAID INSUFFICIENT HEED TO MAKING A LIFE. WE HAVE MADE THE MEANS OF LIVING A GOAL OF LIFE."

I BELIEVE THAT WHATEVER HAPPENS IN THE FUTURE THAT WE MUST TAKE INTO CONSIDERATION THE ITEMS OF CONCERN AS POINTED OUT IN RABBIE GINSBURG'S ADDRESS TO THE CAE LUNCHEION.

THANK YOU VERY MUCH FOR THIS OPPORTUNITY TO PRESENT MY VIEWS.

Blair MacLean: We feel that all the players have to be involved in drawing up legislation on the provincial, federal, and collective levels to protect both the employee and the employer from the enormous side effects of tech change and work out some formula to cover the cost of retraining, etc., without putting the whole burden on any single fraction.

Betty Thomas: We just had one additional item that we talked about at our table, we concur with all the other suggestions that were made. We talked about that the P.E.I. Labour Relations Council should form a sub-committee to interact with other provinces on a regular basis to keep abreast of the latest technological changes and at the same time ensure that these benefits and butdens which would flow from it be accurately evaluated and shared in turn with the labour-management committees on P.E.I.

Analysis of Forecasting Exercise:

Marc Zwelling: The exercise was forecasting technology that would matter to P.E.I. There are of course many kinds of technology but we picked the tunnel and the causeway to New Brunswick. As you see, people don't expect the causeway very soon. Many people don't want the causeway. It was a good example because clearly people are divided in P.E.I. about whether there should even be a causeway. Those who are dead set against it or those who are dead set for it might have to do some interesting things. Is it possible to form a pro-causeway political party for example? What about a referendum? These kinds of questions come to mind.

What this exercise is is called "consensus forecasting," and it's perfectly valid. You'd be surprised. Over the years it is possibly the second most used tool in the corporate world for forecasting. It is called a qualitive, not a quantitave, forecasting method. Instead of using computers, instead of doing number crunching and all the rest of that stuff, you ask experts. Now of course you could make a mistake if you draw the wrong panel of experts and ask people who don't know anything, but what you find out by comparing all these consensus forecasts is that there are a lot of experts around, and just because you are not a causeway builder doesn't mean you can't have a valid opinion that contributes to the consensus forecast. The methodology of consensus forecasting is to then throw out the extremes, so what we've done here is we've found the median. We took out the 25% on this side and the 25% on that side of those who said we were going to have a causeway. We've tried to find the midpoint, and the midpoint is that the causeway will be finished sometime about July, 1998.

The value of this is that if you want to build a causeway with P.E.I. labour, do you have to start training people now in how to build a tunnel or a causeway? Maybe you already have those people . It means if you want to do it with P.E.I. based folks, you couldn't do it , or people think it would be possible ot do it sooner. But you certainly could do it if you had 13 years lead time. You could start a causeway or a tunnel building course right now and do it all yourself, but if you don't do it yourself you can be sure the profits will all end up back in Ontario with someone who comes and demands the project.

On the other hand, there's a strong number of people in this survey who say never, it will not be built. The people won't tolerate it. The government won't pay for it, or we'll lie down in front of the bulldozer before we let them build a tunnel. This is how you find out the probablity of this tunnel or causeway ever being built. We had 140 responses and we had 37 people saying never, so we divided to get the percentage of nevers, which was a little over 26%, and we subtracted that from 100% to get the probability, so you now have a two part forecast. There's a 74% chance that at some time there will be a causeway, that P.E.I. will be connected to the rest of the country. So you have just given me bery good, very expert information. I mean this not in any facetious way. I can now go back home and tell clients who are interested in the future of P.E.I. that the causeway or tunnel is coming. Not right away, but I've talked to expert people in P.E.I. the other day and they're business people, they're employers, they're union reps, and they're political activists and they're right wingers and left wingers and they're center wingers and this is going to happen, but not right away.

We asked in the forecast as well, the fertility rate, because I think I may have convinced a couple of people in the room that that matters. The consensus, all the people in the room, said 15% of the women today who are in that fertility period of 15 to 50 years old, don't want any children at all. The consensus was that 31% want one child and that's all. 39% want two children, and 15% want three or more. We totaled those percentages to get the total fertility rate for this generation of women of 1.4%, so your forecast is that the fertility rate in P.E.I., which is now about 1.8%, is going to go down some more. So we aren't going to need a lot of elementary school teachers, we may not need very much daycare because we're running out of babies altogether. If that's a problem to you, and if you feel that based on the consensus of this group we are going to a fertility rate of something like 1.4%, that is bad news. We have to do something about that. Therefore we have to have some sort of incentives, we have to have the conditions in place to encourage faster fertility, more children, or we have to compensate for the fallen fertility by bringing in more people. That might help. As I said in the beginning, I give you the ideas, you work out the details!

The other thing that you were asked to forecast was the sectoral employment, because it had great implications for how you train or who you train for what. You remember that I gave you the 1951 sectoral breakdown, the number of people working in those sectors, and P.E.I. in 1951 was a strong agricultural province and almost half of the people still worked on the farm. Well, in 1985 that had dropped significantly to less than 20%, manufacturing stayed about the same. The farm workers didn't, like in many parts of the country, move from the farms into the mines and smelters and the blue collar jobs. They skipped that in P.E.I. it seems, and they went right form the farms into retail, banking, government, public sector, health, education. The point of this is that if you're going to forecast the future and you're going to find out how quickly technology will affect you, or how quickly your job will be wiped out, or how fast you can create jobs, you have to know where you are now. Some people in the room didn't do a very good job about all that and the problem was you were sort of right in the direction of services, many people were at 50%, that's common. People sort of understand there's a lot of services out there, but where they miss is where you missed, on agriculture. There is a feeling in our country, there's a feeling obviously in this room, that agriculture is still very important as a job-producing area. I'm not saying it's not important in the economy, it obviously produces a lot of revenue, but it's not producing jobs. So a kind of industrial strategy or an agricultural strategy, a potato strategy, would probably produce some income, but it's not going to produce any jobs. You missed that. Now I don't mean this in a critical way, everybody misses it. It's amazing to go to the experts, and Shelly and Jeff and I sometimes do seminars for government people, we have people with the title Policy Analyst, Manpower Forecasting, Labour Market Analyst, and a lot of other things like that, and they're bad. They miss it. I think one of the reasons is that back in Upper Canada we still have a farm show every afternoon on C.B.C. We don't have an information services show, or a service sector show, or anything else, but every noon during the week on C.B.C. radio there is still a farm show, beamed of course to a largely agricultural audience, but also played on radio stations in urban centers, and it gives us an impression that this is still a very bigh part of what we're doing and it must employ lots of folks. It hardly employs anyone, relatively speaking. It is still very important in terms of earning export income, we ship a lot of wheat out.

That's kind of a rough estimate of where the country is going and you'd want to say whether you agree or disagree. It's reasonable under the changes that have happened in P.E.I. in the last 30 years to make that kind of forecast. More people are working in services, continuing to climb in manufacturing, continuing to drop in agricultural employment. Now the reason that we have some confidence in that is as I've mentioned, we've been looking at these trends for 30 and 35 years. Do you think that would change, is it possible for you to imagine that manufacturing would employ 35% or 40% of the people on P.E.I.? And if you want it to, how would you do it? How would you convince the investors and the manufacturers and the other kinds of people to do that? What sorts of industries would that be, because don't forget you'd have to bring in industries that were labour intensive. If you did manage to win the national competition fo the Toyota plant, it would probably have a lot of robots in it, a lot of automated assembly lines and the rest. So it might be a lot of interesting economic activity, but probably not very job intensive in the scheme of things.

I mentioned in the speech, and I want to take one extra moment to try and talk about this, that you need more than one tool for forecasting, and I think it's a good summary sor some of the things you said today. The difficulty in forecasting technology is that we get misleading clues very often because we look at different rates of change. The power of computers for example has expanded by about 100% per year over a 40 year time period. There are many ways of measuring this, but you know that you can now put on a small mini microchip vast amounts of memory, the sort of thing that previously took computer equipment occupying a room, all that has now been digitized, miniaturized, which is why we can do very sophisticated forecasts on a pocket calculator, literally that runs on a battery because all that power has been shrunk and imbedded into such a small piece of technology. The memory costs have declined at something like 30% a year over 40 years. Another kind of technology is the speed of a car. We've been able to improve that by 10% a year over 150 years. Basically we're not getting a car that can go much faster today, partly because of speed limits and that sor of thing. How fast can a car go? A smaller rate of technological change.

The interesting thing is that if you only measure technology and technological change as the speed of change in society on the whole you get a false clue because when you look at population in society, national peopulation has grown in the world about 4% at the most per year. This is over centuries. It's true we have many more people on earth than we ever did before but the total peoplation of the earth has not expanded 100% a year, or hasn't changed anything like the way the power of computers or other technology has changed. Cities are growing faster than countries in terms of population because that's where the jobs are. People of course for the last 30 and 40 years are leaving the farms, leaving the rural areas and coming into the bigger cities. But even so, the fastest growing urban populations are cities like Mexico City, which don't really work any more they're so jammed with people and they're looking at something like 20,000,000 people in Mexico City alone at the end of the century. A number that we just can't even imagine, but that still represents population growth of about 2%, 3% or 4% annually, again a much slower rate of change than you'd find in technology. To get down to human beings and the possibility for humans individually to change, you find a much slower rate of change.

We are expanding our education at something like 2% a year, we have done so for about 30 years. One of the slides I used earlier talked about the power of education in the 1950's, typically people went to school for seven or eight years. Well, in the 80's and beyond we see them going to school for 12 or 13 years, getting some post-secondary education. With retraining and pursuing second and third and fourth careers or vocations in a life time, there will be even an increasing demand for educatino. But the education capacity for the human being is still growing much more slowly.

Then in a more philosophical vein, what's been the change in human nature, you know, since recorded time, since history began? You still have people saying, "Why do we have wars and envy and things like that? Why can't we be perfect people?" That's just a more abstract way of saying don't pretend or don't assume that because something changes very quickly in a technological sense that the whole society is whirling in the same way. You'd want to see this kind of diagram kind of depicted in three dimensions. You have many slower kinds of rates of change to look at.

The Honourable Tom McMillan:

You have spent today talking about technological change and its impact on our Island. Like you, I congratulate our chairman for filling in so ably for the unavoidably absent Edgar Gallant.

It is a great pleasure to be here this evening, particularly because you were wise enough to choose Summerside for your meeting. Not that I am surprised. Summerside, if we believe Peter Pope, is the capital of the free world, if not the very centre of the universe.

Incidentally, those of you who watch television will understand why I am now announcing that, immediately after this dinner, I will be releasing all my travel accounts to the media.

If you know me, you may be wondering why I was invited to address this conference. I am not an electronic whiz, but, like most of you, I am learning more about computers every day. At first, I heard that it was like riding a bicycle...you make a few mistakes but you get better at it. But then, as I gained experience, I was told that learning to operate a computer is like learning to play the piano. You strike the wrong keys, but eventually you get the hang of it. Well, after a day of not being able to answer the prompts and having files disappear into thin air, I have finally figured out what learning to use a computer is really like. It is like learning to play the piano while riding a bike.

I have been fortunate in getting a cram course in technology in the eleven weeks since my appointment as Minister of the Environment and it has given me an entirely different perspective in talking to you today. If I had come as originally planned, wearing a Tourism Minister's hat, I might have talked to you about how automated reservation systems can increase hotel efficiency or how forecasting programs should be used to estimate future tourism needs.

Now, however, I have gotten a much closer look at technology, both as a reality and as a context in which to view this Island's future. I would like to share some of my perceptions of both of those with you today.

Technology presents us with only one certainty: the future will not be like the past. Because of that, it has caused great anxiety--and rightly so. After all, much of today's technology is meant to offer business and industry a more efficient, less labour-intensive way of producing goods and services. Nonetheless, the "Chicken Littles" amongst us have been proved wrong.

You remember "Chicken Little", don't you? The first time it rained, she ran around crying that the sky was falling, the sky was falling. The basic tendency of humans to mininterpret events and to wring their hands is also the premise of a currently successful movie about what happens to a primitive desert tribe when a pilot throws an empty Coca Cola bottle out of his airplane and it lands in their midst. They, too, reach the wrong conclusion on the basis of insufficient information. For that trive, the Coke bottle becomes a crazy god.

The fact that few people comprehend technology is hardly surprising. After all, 1985 marks the first decade of the worlds love affair with the micro-computer. It is hard to believe, but the first article describing micro-computers appeared only in January, 1975 (in Popular Electronics). It became part of the arsenal of the doomsayers who had been filling the air with dire warnings about the number of us who would be thrown out of jobs, dismissed from meaningful work by the machine-made czars of the technological revolution.

Happily, those predictions did not come true. There has not been a substantial shrinkage of the number of jobs available to Canadians. Labour historian Desmond Morton put it well in his brief to Labour Canada's Task Force on Micro-electronics and Employment: "In retrospect, the original near-hysteria which suggested that jobs would vanish by a quarter past four this afternoon if we didn't do something, turned out to be absurd."

What we have seen is that technology causes employment shifts from one industry to another and within the same industry, more than any net loss of jobs overall.

That is why the Prince Edward Island Labour-Management Relations Council and the movement of which it is a part are increasingly important to Canadian life. It provides a forum in which key economic partners can sit down and look at problems intelligently and effectively. By searching for mutually agreeable ways of reaching mutually acceptable goals, you make yourselves essential to Prince Edward Island's beneficial use of technology. Moreover, a labour-management forum like this is, itself, a hopeful statement about the possibility of cooperation in a field where cooperation is essential.

Technology has done more than make your work essential. It has done more than just reshape the workplace and the marketplace. It has provided incredibly powerful tools for every conceivable personal, medical, commercial and industrial use. For example, in the never-ending search for the most precise measurement possible, we have reached the age of the femtogram. The femtogram, I have learned since coming to the Department of Environment, is a part of a gram...a very small part of a gram. "How small is it?" they would ask on the Johnny Carson show. I'll tell you how small it is. It is the smallest amount we can detect with our most sophisticated scientific equipment. If you were to measure it in time, instead of size, it would be three seconds in a million centuries.

The existence of the femtogram can be taken as an indication of the immense power, resourcefulness and precision of modern technology. That same technology has given us hundreds and hundreds of new chemical compounds. Before we allow ourselves to be bowled over by the sheer magnitude of scientific and technological capability, I should point out, however, that technology suffers from severe limitations.

At this moment, technology has let us down by its emphasis on creating materials that, in turn, create problems...particularly health and environment problems...for people. Where, for example, is technology when, having given us the dioxin, it leaves us to deal with dioxin's terrible effects? Where is the technology to deal with the consequences of technology? So far, it is non-existent.

Technology, after all, exists in a moral vacuum, neither good nor bad. It just is. That fact, of course, is not unique to our time. History is rife with examples of people who suffered because the inventions they assumed were intrinsically good could be put to other uses. When Alfred Nobel formulated TNT, he expected that it would be used to make the world more peaceful, not to make war more horrific. The deep anguish of learning otherwise haunted him for the rest of his life. Even Albert Einstein dispaired at the recognition that his genius had borne the poisoned fruit that was the atomic bomb.

Does that make technology anathema to those of us who are Prince Edward Islanders? Should we shun the change it will inevitably bring? After all, geography made us an Island race...by definition, a race apart. Moreover, our isolation has conferred at least some rewards on us. We are still truly "the garden of the Gulf," fresh and unspoiled in a society filled with the second-rate, the warmed-over, the pallid and the boring.

I submit that, rather than ignore the change implicit in technology, we should rush to meet it. And there are two very good reasons why. The first is absolutely practical...because we have no choice! Consider just these few facts, discussed in Austria recently at an international conference at which a senior member of my Department was chairman.

> Within 50 to 70 years, the amount of carbon dioxide and other gasses in the atmosphere will mean an increase in the world's temperature. At Prince Edward Island's latitude, that increase will be somewhere between three and four degrees Celsius. That translates into changes in the crops our farmers plant, in the nature and scope of our tourism, in our fishing industry, even in our family life. The increase in temperature will carry with it another, more ominous, change. The sea level will likely rise by as much as a metre and that, of course, will mean more frequent flooding of our estuaries and more rapid erosion of our beaches. Only a world-wide commitment to reducing fossil-fuel consumption and to using less of the freon gas so popular in refrigerants and spray cans can now reverse that course.

But, if the future demands that we Islanders must change, the past shows that we can change. We have seen people come and go, we have seen industries flourish and die, we have lived through the good times and the bad. And, always, we have been prepared to face change, especially, I should point out, the change that comes from technology.

Our first industry, after all, was shipbuilding, in the days when the splendid sailing vessels plied the oceans that separated us from the political, emotional and cultural centre of our lives, England. Between 1861 and 1870, more than 900 ships were launched in P.E.I., some as heavy as a thousand tons. In fact, it was the shipyards that moved Summerside itself from being little more than a crossroads to being our second-largest community.

But change, in the form of the iron and steam that replaced wood andsail, was inevitable. The province that had launched an armada of ships in the 1860's produced fewer than five dozen just 20 years later and almost none today.

But we did not turn against progress. In fact islanders calmly accepted farm implement technology. We had our first threshing machine in 1828 and our first reaper two years later. We had industry, tanneries, blacksmiths, and in 1884, we had telephones. Just a year later, we had electric lights. (Astonishing, isn't it, that it took a century before we had the federal-provincial energy agreement that finally gives us something to cheer about in Prince Edward Island when we turn on those electric lights.)

The point I am making is that change is not new to us in Prince Edward Island. We have been and done many things.

We did not reject progress until just after the turn of the century. That was when T.B. Grady and Frank Compton of Summerside brought a second-hand Ford to the Island in 1905 and F.R. Frost brought in his second-hand, single-cylinder Cadillac. Cars were too much for decent people to cope with. The controversy kept Islanders wll supplied with arguments, for and against the car, until long after the First Would War. We even passed a law banning the automobile. That experiment in superimposing the 19th Century on the 20th, however, retarded the early growth of our tourism industry and perhaps even made us look and feel a bit silly.

If our attempts to protect what we cherish about this Island seem naive in retrospect, they are at least understandable. They show us how strong the demands of technology really are. They challenge us to find better solutions this time around.

I believe that those better solutions are well within our grasp. We do not need to fear that we will turn into a race of computer-hypnotized zombies. Less than a month ago, the new President of the University of Prince Edward Island, C.W.J. Eliot, spoke movingly of his goals, and his words are worth repeating in today's context. Dr. Eliot said, "I want our students...to be balanced individuals with their intellect sharpened, of course but also with their sensitivity heightened and their creativity awakened...I want them to be... poets who have discipline, a strong emotional response...individuals in whom the rational, the emotional and the creative have found a balance..."

In that spirit, it is our job to be realistic about technology's gifts as well as its traps. Someday, we will have to reinforce our electronic connection to the rest of Canada by building that fixed crossing--the tunnel--many of you have heard me discuss on other occasions. Ah, I can see the eyes glazing over and practically hear someone thinking, "Not that again, Tom. Not torture by the tunnel speech." Well, technology's gifts include new kinds of construction and new kinds of environmental safety techniques. These are the technologies that Islanders can pioneer, for their own benefit and for the benefit of others. Given our steadfastness of spirit, given our history, we can--if we decide to--build that tunnel, and build it sooner and better than the one just announced, again, by England and France.

Similarly, we can enhance other technologies, just as we have in the past--with many more benefits than costs, including benefits in terms of job creation.

There have been times when Islanders felt passed over when prosperity was on the agenda... we had no oil wells gushing wealth, no mines producing gold or silver or uranium, no waterfalls to give us cheap electrical power.

Now, however, technology has become the great equalizer. The computer and its brilliant little addition, the modem, make the future a new game for the people of Prince Edward Island. Your child is no longer at an economic disadvantage because he or she was not born near the Rosedale subway station in Toronto or the Ritz Carlton Hotel in Montreal. In fact, the importance of geography has been repealed, in favour of the importance of ideas, determination and courage.

Considering that Islanders have always had those characteristics in abundance, it is clear that...to paraphrase Norman Mailer...we on Prince Edward Island are living in the time of our time.